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MOORE (W. C.). **Presidential address. Organization for plant pathology in England and Wales—retrospect and prospect.**—*Trans. Brit. mycol. Soc.*, xxv, 3, pp. 229–245, 1942.

After briefly reviewing the history of the organization of research on plant diseases in England and Wales from the end of the last century until about 1923, the author describes the phytopathological service as it exists to-day and discusses a number of ways in which he considers its efficiency might be still further increased.

RADEMACHER (B.). **Gedanken über Nachkriegsaufgaben im Pflanzenschutz.** [Reflections on post-war aims in plant protection.]—*Z. PflKrankh.*, lii, 2–4, p. 51–56, 1942.

Among the many pressing enterprises to be undertaken by German phytopathologists on the conclusion of hostilities may be mentioned the extension and simplification of research, in which connexion stress is laid on the urgent need for the translation of foreign (especially Russian) scientific treatises, and for a reform of the present abstracting system, so that German workers may no longer depend exclusively for their knowledge of the relevant literature on the English abstracting journals; the introduction of special phytopathological courses into the college curriculum to form a basis for subsequent practical training; and the continuation of studies already in progress on the commercial control of various pests and diseases.

TAKAHASHI (W. N.). **A virus inactivator from yeast.**—*Science*, N.S., xcv, 2475, pp. 586–587, 1942.

The author has extracted a virus inactivator from yeast by the following method. One kg. frozen baker's or brewer's yeast is mixed with 4 l. distilled water and autoclaved for 30 mins. at 15 lb. pressure. The autoclaved material is filtered through a pad of celite No. 505, and the filtrate treated with two volumes of acetone or alcohol. The precipitate is separated from the liquid by centrifuging, and is dissolved in a volume of distilled water equal to that of the original filtrate. Precipitation and solution in water may be repeated several times, but an electrolyte must be added to effect complete precipitation. This partially purified substance was used in preliminary work, but later the inactivator was further purified by clearing with safranin and neutral lead acetate, followed by heating in twice normal hydrochloric acid.

Changes in the concentration of tobacco mosaic virus induced by the inactivator were measured by inoculating half leaves of *Nicotiana glutinosa*, one half of each of 20 leaves being inoculated with each treated sample and the other halves with corresponding controls. In one typical experiment, treatment with 0·303, 0·625, 1·25, 2·5, and 5 mgm. inactivator per 100 c.c. of a suspension containing 5 mg. virus gave, respectively, 32·3, 14·8, 10·05, 3·14, and 1·42 per cent. of virus remaining active. Thus, with each doubling of inactivator concentration roughly a halving of active virus concentration occurred. This suggests a chemical reaction between one unit of inactivator and one unit of virus. The virus-inactivator combination was broken when the mixture was heated to 99° C. for 10 minutes.

When rose, peach, and pear scions from virus-infected parents were placed in a solution of the inactivator for several days and grafted to healthy stocks, typical symptoms of each disease resulted. In further experiments with leaves no conclusive evidence was obtained that the inactivator destroyed the virus. The substance in question appears to be a polysaccharide.

Resühr (B.). **Zur Chemie der Symptombildung viruskranker Pflanzen.** [On the chemistry of symptom production in virus-diseased plants.]—*Z. PflKrankh.*, lii, 2–4, pp. 63–83, 15 figs., 1942.

With a view to determining the possible rôle of substances, other than the viruses concerned, in the production of symptoms in virus-diseased plants, the author carried out a series of experiments at the Bonn Phytopathological Institute involving the injection into various plants of 55 organic compounds and a series of crude tannins.

The introduction of a 2 to 4 per cent. solution of hydrolysable or condensed tannin into the shoot axis in doses of 0·05 to 0·1 c.c. resulted in vein-clearing, vein-banding, loss of chlorophyll, asymmetry, vein-browning, mosaic and local necrosis, stunting, crinkle, undulation (notably of bean [*Phaseolus vulgaris*] leaves), leaf roll (of broad bean), thickening and shortening of the shoot axis, e.g., of tomato and soy-bean, and breaking of tulip flowers. Anthocyanin formation, one of the symptoms of big bud [*R.A.M.*, xx, pp. 182, 235], occurred in the treated tomato leaves. Contrary to Schweizer's observations, in connexion with a study of potato leaf roll, as to the accumulation of starch in the foliage into which tannin was injected [ibid., x, p. 333], starch production in the leaves of *Nicotiana glutinosa* in the writer's tests was lowered by the treatment. In general, the injection of the hydrolysable gallic acid esters induced much more acute symptoms than those resulting from catechin tannins, except at high concentrations. However, the pathological effects on the plants of these two structurally divergent groups were of the same order, whereas those due to haematoxylin, a relative of the catechins, were quite dissimilar. Gallic acid itself was the only phenolic non-tannin to exert a similar action to the tannins, especially as regards vein-clearing. All the other phenol compounds, in so far as they diffused into the leaf blade at all (some destroyed the tissues immediately on contact), provoked severe, sometimes local, interveinal necrosis, e.g. resorcin and orcin on *N. glutinosa* and peas, ill-defined chloroses of the tissues adjoining the main veins, extensive discoloration and death of the leaf blade, mild crinkle and undulation (pyrogallol and pyrocatechin on tobacco, for instance), or foliar malformations (protocatechualdehyde on *N. glutinosa*).

Analyses of the leaves and shoot axes of cauliflower, Chinese cabbage, rape, *Tulipa gesneriana*, tobacco, potato, and *Abutilon* plants spontaneously infected by viruses revealed a tannin content exceeding by 0·1 to 0·8 times and upwards (calculated on a dry-weight basis) that of the corresponding portions of healthy individuals. In the case of plants receiving artificial injections of tannins the increase in the contents of such substances amounted at the most to 1·3 or 1·4 times the normal.

As with natural virus infection, the injected tannins require a minimum incubation period of some days at 15° to 20° C. to produce their symptoms, which may, again like the milder forms of spontaneous attack, be reversible. Another feature in which the effects of tannin injections resemble those of virus diseases are the asymmetrical patterns arising from the diffusion of the extraneous substance through the leaf, sometimes at a considerable distance from the site of inoculation. Like the viruses, moreover, the tannins induced much weaker symptoms, e.g., on tobacco, *N. glutinosa*, peas, and rape, at 30° than at an average temperature of 15° to 20°.

From the results of these experiments, supplemented by a study of the relevant literature, the author concludes that many of the pathological effects of viruses are bound up with disturbances of the phenol, and more particularly of the tannin, metabolism of the host.

Lindegren (C. C.) & Lindegren (Gertrude). **X-ray and ultra-violet induced mutations in Neurospora. II. Ultra-violet mutations.**—*J. Hered.*, xxxii, 12, pp. 435–440, 1 fig., 1941.

The writers have continued their studies at the University of Southern California, Los Angeles, on the inducement of mutations in *Neurospora crassa* [*R.A.M.*, xxi, p. 154] by irradiation with ultra-violet light with a wave-length of 2537 Å from a mercury vapour tube situated 21 cm. from the surface of the nutrient agar cultures and delivering 900 ergs per sq. mm. per minute. Under 1 per cent. of the spores withstood the treatment, and some 9 per cent. of the surviving individuals gave rise to mutants, nearly half of which were degenerate phenotypes not susceptible of genetical analysis, though one (U-8, burnt-fluffy type of colony) made exceptionally vigorous growth and sporulated profusely on potato dextrose agar; this is the first progressive mutant hitherto detected in *N. crassa*. None of the ultra-violet mutants displayed the diminished fertility characteristic of chromosome inversion.

In the first series of X-ray experiments, some 50 per cent. of the spermatia survived, and of these about a quarter yielded mutants.

Jameson (Dorothy H.) & Schmidt (Catherine M.). **Boron as a plant nutrient. A bibliography of literature published and reviewed, January 1939, through December 1939. (With index). Supplement II.**—xviii+81 pp., American Potash Institute, Inc., Washington, D.C., 1940. [Mimeographed].

Schmidt (Catherine M.) & Jameson (Dorothy H.). **Boron as a plant nutrient. A bibliography of literature published and reviewed, January, 1940, through December, 1940. (With index). Supplement III.**—xvi+68 pp., American Potash Institute, Inc., Washington, D.C., 1941. [Mimeographed.]

These supplements continue the annotated bibliography of boron as a plant nutrient published by the American Potash Institute [cf. *R.A.M.*, xviii, p. 702]. Together they contain 700 items.

Van der Merwe (D. J.). **The occurrence, characteristics and function of manganese in soil and plant.**—*Fmg S. Afr.*, xvii, 195, pp. 360–364, 1942.

On the Cape Flats, western Cape Province, South Africa, where there is general manganese deficiency in the soil, bean [?*Phaseolus vulgaris*] plants were effectively treated by spraying with a ¼ per cent. potassium permanganate solution, and maize, tomato, potato, and pea plants by spraying with a ¼ to ½ per cent. manganese sulphate solution.

In Somerset West, vines affected by manganese deficiency showed interveinal chlorosis and gave a poor yield. The affected leaves had a manganese content of 32 parts per million, as against 360 to 413 p.p.m. for healthy vine leaves elsewhere.

In the same locality, a manganese deficiency was determined in potatoes and green beans, and was overcome by applications of manganese sulphate to the soil. Peach trees in this area reacted to spraying with a ½ per cent. manganese sulphate solution, and pear and citrus to one of 1 per cent.

At Stellenbosch and Brakenfel citrus, peach, bean, nectarines, and plums were successfully sprayed with one or other of the following: ¼ per cent. potassium permanganate, 1 per cent. manganese sulphate + ½ per cent. calcium hydroxide, and ¼ per cent. manganese sulphate.

At Constantia, manganese deficiency affected grape vine, granadilla, apricot, and chestnut trees. At Biene Bonne affected citrus trees were successfully sprayed with 1 per cent. manganese sulphate solution. Peaches were also affected at Elgin, and showed a general interveinal chlorosis accompanied by poor yields. The condition responded to injection with manganese solutions.

WALLACE (T.) & OGILVIE (L.). **Manganese deficiency of agricultural and horticultural crops. Summary of investigations, season 1941.**—*Rep. agric. hort. Res. Sta. Bristol, 1941*, pp. 45–48, [1942].

Further investigations on manganese deficiency of crops in the vicinity of Long Ashton [*R.A.M.*, xx, p. 439] confirmed the outstanding susceptibility of oats, but also showed that wheat may be severely affected on certain silt clay soils.

Experiments on Globe beetroots showed that manganese sulphate and manganese chloride used as fertilizers at rates equivalent to 100 lb. manganese sulphate per acre effectively overcame the deficiency only during the earlier stages of growth; manganese ores used at a similar rate were ineffective at all stages. Used as sprays at rates between 5 and 40 lb. per acre on plants half-grown or in the later stages of growth, manganese sulphate and manganese chloride were very effective, the former rate being adequate for commercial purposes.

ROBBINS (W. J.) & KAVANAGH (VIRGENE). **Vitamin deficiencies of the filamentous fungi.**—*Bot. Rev.*, viii, 7, pp. 411–471, 1942.

Preceding a list of filamentous fungi (arranged in alphabetical order) and their vitamin requirements is a brief critical survey and discussion of the general principles, exemplified by concrete illustrations, underlying the utilization by this group of organisms of the accessory growth substances (a term defined as embracing a wider scope than vitamins). Among the aspects of the problem investigated are the capacity of the individual fungi for vitamin synthesis, the functions and specificity of the several vitamins, the requisite amounts of auxins for the promotion of growth, and the methods of investigation employed in the determination of fungal needs in this direction. References to a number of the papers in the seven-page bibliography have already appeared in this *Review*.

THATCHER (F. S.). **Further studies of osmotic and permeability relations in parasitism.**—*Canad. J. Res.*, Sect. C, xx, 5, pp. 283–311, 2 pl., 9 graphs, 1942.

Continuing his earlier studies on changes in host cell permeability induced by fungal parasitism [*R.A.M.*, xviii, p. 812], the author found that *Puccinia graminis* race 21 increased permeability in the cells of the susceptible Mindum and Little Club wheat varieties. The resistance of Mindum to race 36 of *P. graminis* was associated with a local decrease of cell permeability. Narcotization of Mindum wheat increased permeability and rendered it more susceptible to race 36.

Increase of permeability resulted from tissue invasion by *Botrytis cinerea* and *Sclerotinia sclerotiorum* on the petioles of mature celery plants and by *Phytophthora infestans* on potato petioles.

Decreased permeability of the tissues of swede 'root' near the margin of a necrotic lesion due to *Phoma lingam* was interpreted as a change in accordance with Brown's suggestion [ibid., xiv, p. 189] that a dry rot is determined by the ability of the host to restrict the amount of water reaching the fungus and so arrest the progress of its enzymic activity at an intermediate stage.

STEINBERG (R. A.) & THOM (C.). **Reversion in morphology of nitrite-induced 'mutants' of Aspergilli grown on amino acids.**—*J. agric. Res.*, lxiv, 11, pp. 645–652, 1942.

In further studies on chemically induced variants or mutants of *Aspergillus* spp. [*R.A.M.*, xix, p. 722], a nitrite-induced mutant of *A. niger* was observed to revert to the morphology of the original strain when grown on lysine, cystine, β-phenyl-β-alanine, threonine, and valine. The best results were obtained on a mixture of nicotinic acid, lysine, and valine. Complete reversion of a nitrite-induced variant of *A. amstelodami* took place only with a mixture of lysine and threonine. The ability to assimilate amino acids did not appear to play a major part in these responses. The respective

capacities for amino acid utilization in the standard strain and each of two variant strains of *A. niger* varied proportionally to the extent of morphological change.

KÖHLER (E.) & BÄRNER (J.). **Über den sogenannten latenten Virusbefall in deutschen Kartoffelsorten.** [On the so-called latent virus infection in German Potato varieties.]—*Forschungsdienst*, xiii, 1, pp. 14–18, 1942.

During 1938–9 greenhouse tests were conducted at the Biological Institute, Dahlem, Berlin, to determine the extent of latent virus infection in 68 officially recognized German potato varieties, with a view to the ultimate exclusion from cultivation of any carrying disease in a masked form. The presence of concealed infection was established by the development of the typical symptoms in slips, supplemented by transmission to tobacco where indicated. Eleven varieties of externally healthy aspect were found to be harbouring viruses, viz., X in Erstling [Duke of York], Early Rose, Direktor Johanssen, Jubel, and Wart-Immune Kaiserkrone, A in Allerfrüheste Gelbe and Paulsen's Juli, and Y in Frühe Hörnchen, Rote Mäuse, and Tannenzapfen; out of 149 Preussen tubers, 28 yielded A, 116 X, one both, and four neither. All these varieties have been on the market for considerable periods, even the most recent, Allerfrüheste Gelbe, since 1922.

Of the viruses represented, X is chiefly injurious to the varieties actually carrying this source of infection, whereas A and Y are readily communicable by *Myzus persicae* to adjacent plantings. Serious damage is also likely to ensue when plants already harbouring X contract fresh infection by A or Y, the mixture exerting a peculiarly virulent influence. The X virus is easily transmissible in the field from diseased to healthy plants by means of the sap, e.g., through foliar contact and agricultural implements. Such sources of contagion, however, can be avoided by the exercise of reasonable care, whereas the elimination of A and Y demands special precautions, notably in districts where peaches are grown in proximity to potatoes, i.e., virtually throughout Germany [*R.A.M.*, xx, p. 487]. In such regions Juli, Allerfrüheste Gelbe, Frühe Hörnchen, Rote Mäuse, and Tannenzapfen should be grown in specially selected sites remote from other potato plantings, particularly those destined for seed. Where this is impracticable, growers would be well advised to relinquish the use of these varieties altogether.

SKAPTASON (J. B.) & BURKHOLDER (W. H.). **Classification and nomenclature of the pathogen causing bacterial ring rot of Potatoes.**—*Phytopathology*, xxxii, 5, pp. 439–441, 1942.

The reasons adduced for the authors' acceptance of the name *Corynebacterium sepedonicum* for the agent of bacterial ring rot of potatoes [*R.A.M.*, xxi, p. 364] are briefly discussed in relation to the existing confusion in its classification. Thorough studies of the morphology and physiology of the pathogen have shown it to possess all the features of a *Corynebacterium*, including (1) pleomorphism, with the formation of large numbers of clavate cells, (2) non-motility, (3) V- or L-shaped cells indicating 'snapping division', (4) staining and acid reactions, (5) almost exclusive single occurrence of the cells, (6) demand for a complex medium containing an abundance of proteins, (7) strictly aerobic growth, (8) general biochemical inactivity, and (9) very slow rate of development on standard media. The organism should in future be known as *C. sepedonicum* (Spieckermann & Kotthoff) comb. nov. [presumably antedating Dowson's combination: loc. cit.]. Spieckermann and Kotthoff are regarded as the correct authorities for the original species, the name published by Spieckermann in 1913 being a *nomen nudum*.

SCHROEDER (R. A.) & ALBRECHT (W. A.). **Plant nutrition and the hydrogen ion : II. Potato scab.**—*Soil Sci.*, liii, 6, pp. 481–488, 4 figs., 1942.

The results, in terms of potato tuber and top yields and of scab [*Actinomyces scabies*]

incidence, in tests at the Missouri Agricultural Experiment Station in which the levels of exchangeable calcium and potassium were varied in relation to each other while other nutrients were held constant, all at different degrees of soil acidity, point to the importance of the ratio of calcium to potassium in the production of the crop. Contrary to the common belief in the tendency of liming to provoke scab, a liberal supply of calcium was found to assist the movement of potassium into the tops, the highest yields, coupled with freedom from disease, being obtained by the addition to the soil of approximately equal amounts of the two fertilizers. An excess of potassium over calcium was more conducive to scab than when these ratios were reversed. Thus, the relationship of calcium to potassium is synergistic rather than antagonistic. The observed efficacy of soil acidity as a means of controlling *A. scabies* is apparently based on the mobilization of certain cationic plant nutrients under these conditions.

Marsh (R. W.) & Martin (H.). **Simplified methods of Potato blight control. Progress report III.**—*Rep. agric. hort. Res. Sta. Bristol, 1941*, pp. 79–82, [1942].

In further experiments on the control of potato blight [*Phytophthora infestans*: *R.A.M.*, xx, p. 416] in three localities, using Majestic and Arran Banner potatoes, the proprietary copper fungicides coppesan, perenox, and soltosan gave equally satisfactory results, and sprinkling from a watering can retarded spread as effectively as did spraying.

Mujica (R. F.). **Nomina de las enfermedades y pestes de la Papa cuya existencia se ha comprobado en el país.** [List of Potato diseases and pests of which the existence has been established in the country.]—*Bol. Sanid. veg., Santiago*, i, 1, pp. 70–72, 1941.

The following potato diseases are known to occur in Chile: latent [potato virus X], mild, (*Marmor solani* H.), and rugose mosaics, leaf roll (*Corium solani* H.), spindle tuber (*Acrogenus solani* H.), aucuba mosaic (*M. aucuba* H.), scab (*Actinomyces scabies*), early blight (*Alternaria solani*), rhizoctoniosis (*Botryobasidium* [*Corticium*] *solani*), powdery scab (*Spongospora subterranea*), wilt (*Verticillium albo-atrum*), sclerotiniosis (*Sclerotinia sclerotiorum*), blackleg (*Bacillus phytophthorus* [*Erwinia phytophthora*] and related species), bacterial rot, probably due to *E. carotovora* and allied species (the three last-named diagnosed on a symptomatological basis only), and (?) silver scurf (*Spondylocladium atrovirens*).

Labor de la sección investigaciones y certificación de Papas en el primer semestre de 1941. [Work of the division of investigations and certification of Potatoes during the first six months of 1941.]—*Bol. Sanid. veg., Santiago*, i, 1, pp. 73–74, 1941.

In an experiment on the transmission of potato spindle tuber by way of the tubers [cf. *R.A.M.*, xi, p. 667; xv, p. 776], a much higher proportion of diseased plants arose from the misshapen tubers than from the healthy controls, and this result emphasizes the need for the exclusion of affected tubers from stocks destined for seed.

Circumstantial evidence having suggested the passage of *Spongospora subterranea* through the intestinal tract of livestock in a viable state, leading to fresh outbreaks of powdery scab on potatoes in virgin soils, experiments were conducted to ascertain the value of cooking the infected refuse before its consumption as fodder. This practice, combined with the use of healthy tubers for seed, resulted in complete freedom from the disease.

Verner (A.), Malyshkin (P.), & Kvint (N.). **Development of fungi in the soil.**—*C. R. Acad. Sci. U.R.S.S.*, N.S., xxxi, 8, pp. 812–814, 1941.

The plating and the Cholodny slide techniques were both used with comparable results for the determination of the survival of certain fungi in the soil. *Fusarium lini*, inoculated into sterile and normal soils, was found to increase steadily in the former

(declining only after a certain maximum had been reached, this decline possibly being due to lysis), and to decrease and finally disappear altogether in the latter. It is concluded that the survival of fungi in soil is conditioned by the presence of antagonistic micro-organisms. To check this assumption, a small amount of normal soil was introduced into sterilized soil ten days after inoculation with *Verticillium dahliae*. It appeared that the growth of the fungus in this series was increasing before the normal soil was added, but after the addition it declined and finally stopped altogether, while the number of protozoa increased and that of bacteria fluctuated; in a parallel normal soil series the development was roughly the same as in the first after the addition of normal soil; in a third sterile soil series the initial increase in fungal growth was again followed by a decline. Saprophytic fungi were found capable of a better survival in soil and even of multiplication in it. Thus, 25 days after inoculation, *Trichoderma lignorum* [*T. viride*: *R.A.M.*, xx, p. 491; xxi, p. 220] had increased to 1,910,000 from 48,000 in the normal soil and to 3,650,000 from 93,000 in sterile; *Aspergillus* sp. had decreased to 100,000 from 138,000 in the normal soil, and increased to 138,000 from 128,000 in the sterile.

Brandenburg (E.). **Versuche über Bormangel an Mohn.** [Experiments on boron deficiency in the Poppy.]—*Z. PflKrankh.*, lii, 2–4, pp. 56–63, 5 figs., 1942.

Bertrand and de Waal have shown the poppy [*Papaver officinale*] to be one of the plants with the highest boron content, amounting to 94·7 mg. (579·8 mg. boric acid) per kg. dry weight [*R.A.M.*, xvi, p. 81], compared with which the quantity of boric acid in sugar beets on natural soils is relatively low (average of 250, occasionally up to 320 mg.) [ibid., xviii, p. 428]. In co-operative experiments at the Bonn and Vienna phytopathological stations, Mahndorf Blue poppies, both on soils naturally lacking in boron and in sand-peat cultures from which this element was partially or wholly withheld, developed boron deficiency symptoms corresponding in the main with those of other dicotyledonous plants under similar conditions and consisting of floral and capsule malformations and seed necrosis, and in severe cases of the cessation of growth at an early stage. The boric acid contents of plants in sand-peat cultures receiving 0, 10, and 20 mg. per pot (each containing eight plants and 10 kg. soil) was 124, 177, and 214 mg. per kg. dry weight, respectively, while the contents of those on natural soils given 0, 15, and 30 mg. per pot were 111, 139, and 199 mg., respectively. In a further test with plants in sand-peat cultures (3 l. pots, three plants in each), the boron-deficient plants ceased to grow at a height of 10 to 15 cm. and their fresh weight at harvest amounted to 110·6 gm., corresponding to a boric acid content of 118 mg. per kg. dry substance, while the fresh weights and boric acid contents of the plants receiving 10 and 20 mg. boric acid per pot were 252·9 gm. and 283 mg. and 377·6 gm. and 416 mg., respectively.

Ramakrishnan (T. S.). **A leaf spot disease of Zingiber officinale caused by Phyllosticta zingiberi n.sp.**—*Proc. Indian Acad. Sci.*, Sect. B, xv, 4, pp. 167–171, 1 pl., 1942.

Since 1938, ginger in the Godavari and Malabar districts of Madras has been affected during the late summer and early autumn by a disease involving the formation on the leaves of spots with white centres, dark brown margins, and yellowish surrounding haloes, some circular, 1 by 0·5 mm., and others oval or elongated, 9 to 10 by 3 to 4 mm., usually isolated but occasionally confluent, causing extensive discoloration and desiccation. The causal organism, *Phyllosticta zingiberi* n.sp., is characterized by amphigenous, subglobose, dark brown, ostiolate pycnidia, 78 to 150 μ in diameter on the host, 100 to 270 (mean 177·6) μ on standard media, and hyaline, unicellular, oblong, biguttulate spores, 3·7 to 7·4 by 1·2 to 2·5 (4·3 by 1·6) μ. The optimum hydrogen-ion concentration for the growth of the pathogen on Richards's agar lies between P_H 4·3 and 5·8. Wound inoculations gave positive results on ginger and turmeric (*Curcuma longa*). The disease under observation, though not at present serious, may

lead to a heavy reduction in rhizome yield through the extensive destruction of chlorophyllous tissue. Good control has been secured by one or two applications of 1 per cent. Bordeaux mixture.

PADMANABHAN (S. Y.) & RAFAY (S. A.). **Two new reports of fungi on Saccharum officinarum and S. arundinaceum.**—*Curr. Sci.*, xi, 4, pp. 150–152, 2 figs., 1942.

Characteristic fructifications of *Schizophyllum commune* were observed at the Central Sugar-Cane Research Station, Pusa, in November, 1941, on stalks of Co. 331 sugar-cane killed by 'red rot' [*Colletotrichum falcatum*: *R.A.M.*, xx, p. 228], while similar fructifications were observed a week later on Co. 331 artificially infected with red rot, and on affected Co. 331 canes brought from Motipur. Experimental infections of growing stalks of Co. 331 with pieces of the ripe fructifications and spore suspensions of *S. commune* indicated that the fungus has weakly parasitic tendencies on sugar-cane. That the occurrences were observed on Co. 331 alone, however, indicates selectivity by the fungus.

During August, 1940, uredosori of *Puccinia kuehnii* on previously rust-free clumps of *Saccharum arundinaceum* were found to be parasitized by *Darluca filum* [ibid., xx, p. 570].

SPARROW (F. K.). **Phycomycetes recovered from soil samples collected by W. R. Taylor on the Allan Hancock 1939 expedition.**—*Publ. Univ. sth. Calif. A. Hancock Pacif. Exped.*, iii, 6, pp. 101–112, 2 pl., 1940. [Received August, 1942.]

This is a critically annotated list of six Phycomycetes isolated from soil samples in Central and South America in 1939.

WILLIS (J. H.). **Victorian fungi.**—72 pp., 16 pl. (3 col.), 18 figs., Melbourne, Field Naturalists' Club of Victoria, 1941. 2s. 6d.

This illustrated booklet, to which a foreword is contributed by Ethel I. McLennan, comprises semi-popular notes on the fungus flora of Victoria, the species described numbering 120 Agaricaceae, while brief references are made to Victorian Polypores, Clavariaceae, Gasteromycetes, and five species of *Cordyceps* (*C. gunnii*, *C. menesteridis*, *C. taylori*, *C. militaris*, and *C. hawkesii*).

TERRIER (C. A.). **Essai sur la systématique des Phacidiaceae (Fr.) sensu Nannfeldt (1932).** [An exposition on the taxonomy of the Phacidiaceae (Fr). *sensu* Nannfeldt (1932).]—Thesis, École polytechnique fédérale de Zürich, 99 pp,. 12 pl., 2 figs., 1 diag., 9 graphs, 1942.

The numerous modifications undergone by the family of the Phacidiaceae between its erection by Fries in 1821 and Nannfeldt's revision in 1932 [*R.A.M.*, xi, p. 606] suggested the desirability of an intensive study of the taxonomy of the group, to which the present work is a preliminary contribution. The first chapter deals with the history of the Phacidiaceae, the second with the morphology of the form-types of genera constituting the family, while the third defines the basic principles of a natural system of classification. The outstanding conclusion of the author's researches is that the family is heterogeneous, comprising both ascohymenial and ascolocular forms, of which the former belong in part to the Hypodermataceae and the rest to the Rhytismaceae and are placed in a new order, the Hypodermatales, while the latter are the representatives of the Phacidiaceae *sensu stricto*. The peculiarities of the lenticular fructifications of the Hypodermataceae and Rhytismaceae reveal their affinity with the Drepanopezizoideae Nannf. and the ascolocular structure of the Phacidiaceae relates them to the Dothioraceae.

HILLS (C. H.) & MCKINNEY (H. H.). **A chemical method for the determination of Tobacco-mosaic-virus protein in plant extracts.**—*Phytopathology*, xxxii, 5, pp. 433–435, 1942.

The probability of a considerable margin of error in the results obtained by the method of L. F. Martin *et al.* for the measurement of virus protein in tobacco leaf tissue [*R.A.M.*, xix, p. 168] led to further studies on this problem, the technique finally adopted for the separation of virus from non-virus proteins in foliar extracts being based on Best's observation that the mosaic virus is precipitated from aqueous solutions at its isoelectric point, P_H 3·4 [ibid., xv, p. 531]. An extract of mosaic-diseased tissue was prepared by adding 1 c.c. of M/10 phosphate buffer per gm. of chopped frozen tissue and after thawing the tissue extract was clarified by centrifuging or filtering through celite. A 40 c.c. portion of the clear extract was acidified to P_H 4·2 to 4·0 by N/10 sulphuric acid and a large part of the non-virus protein precipitated during overnight refrigeration removed by centrifuging at 3,000 r.p.m. The supernatant liquid was decanted, acidified to P_H 3·4, allowed to refrigerate overnight and then centrifuged for 30 minutes. Protein nitrogen in the precipitate was determined by precipitation with 2·5 per cent. tri-chloroacetic acid and digestion and distillation as ammonia in a micro-Kjeldahl apparatus. As the protein precipitated included a trace of non-virus protein it was necessary to run a blank on an extract of healthy leaf tissue. Comparative tests showed that the isoelectric precipitation method has a smaller experimental error than the biological assay methods. It is rapid and permits expression in absolute quantities rather than in comparative lesion counts. Biological assays, however, must be used when virus activity is in question, only small amounts of virus are available, and the virus protein concentration is very low.

RYJKOFF (V. L.) & SMIRNOVA (Mme V. A.). **Liquid crystals of the virus of the Tobacco mosaic (Nicotiana virus 1 Allard).**—*C. R. Acad. Sci. U.R.S.S.*, N. S., xxxi, 9, pp. 930–932, 2 figs., 1941.

The formation of liquid crystals was observed in polarized light with crossed nicols under the microscope in drops of purified tobacco mosaic virus by mixing either two concentrations of this virus with one another or a solution of this virus (or *Cucumis* virus 2) with 1 to 3 per cent. solutions of starch or gelatine or with a drop of a liquid glass solution. The liquid crystals are bi-refringent, lens-shaped, varying greatly in size, the largest reaching 140 to 170 μ by 17 to 40 μ.

Sumatra fights pseudo-mosaic disease.—*Foreign Crops Mark., U.S. Dep. Agric., 1942*, January, p. 10, 1942. [Mimeographed.]

The 1941 Sumatra tobacco crop, already reduced by a 25 per cent. curtailment of the planted area, sustained 10 per cent. damage from pseudo-mosaic [or pseudo-peh sim: *R.A.M.*, xx, p. 280], which is favoured by dry seasons. The effects of the disease were most serious on the low-lying coastal estates specializing in the sand-leaf grades sold principally in European markets, plantations situated at higher elevations and producing the good-quality foot-leaves used in the United States being less affected. One of the measures now being applied by scientists in the employ of the Deli Planters' Association is the elimination of a shrub belonging to the boneset [*Eupatorium perfoliatum*] and Joe Pye [*E. purpureum*] weed family, which is believed to harbour the white fly [*Bemisia gossypiperda*] concerned in the spread of infection and almost inaccessible to insecticides.

YATZYNINA (Mme K. N.). **Breeding for Tomato variety resistant to bacterial cancer Aplanobacter michiganense E. F. Smith.**—*C. R. Acad. Sci. U.R.S.S.*, N.S., xxxii, 5, pp. 372–373, 1941.

In inoculation tests carried out during 1939 in hot beds out of doors and on a field

plot, 25 plants out of a total of 2,728 inoculated tomato hybrids from crosses between currant tomato (*Lycopersicum pimpinellifolium*) and different cultivated varieties showed signs of resistance to bacterial canker (*Aplanobacter* [*Corynebacterium*] *michiganense*) [*R.A.M.*, xxi, p. 172]. In the following year progeny of these plants were again found to be very resistant, although not immune. Among them, Lucullus × Currant (No. 1) and Danish Export × Currant (Nos. 9 and 22) showed particularly good growth: none of the three suffered any mortality and their yields were 1·8, 1·7, and 1·5 kg. per plant, respectively. Hybrids from 146 other crosses (6,500 plants tested in 1939 and 1,620 in 1940) showed no resistance to the disease. Of several *Lycopersicum* species tested, only *L. pimpinellifolium* showed a strong degree of resistance.

YOUNG (P. A.). **Two genetic characters of Tomato fruits that might be mistaken for symptoms of disease.**—*Phytopathology*, xxxii, 5, pp. 436–438, 1 fig., 1942.

At the Tomato Disease Laboratory, Jacksonville, Texas, in 1939, two tomato fruits on a plant of the (T560) Michigan State Forcing variety were observed to bear broad, dark green stripes simulating mosaic but apparently arising from a mutation. In 1940, seed from the affected tomatoes produced 23 plants with many small, green fruits traversed from the stem- to the blossom-end of the peel by prominent, broad, dark stripes, which gradually developed into deep pits and grooves and turned yellow in contrast to the normal red portions. Seed from four of the striped fruits was tested for a third generation in the field in 1941. The parent fruits of T560B and T560D bore only stripes, and those of T560C and T560E both stripes and pits: in the field 72 per cent. of the 184 plants of T560B and T560D developed striped and pitted fruits, which also arose from 94 per cent. of the 221 plants of T560C and T560E. These data are interpreted as evidence of the hereditary character of the stripe and pit symptoms, which are distinctly different from those of tomato fruit pox or fruit stripe [*R.A.M.*, xix, pp. 499, 622].

KEARNS (H. G. H.). **A method of spraying outdoor Tomatoes.**—*Rep. agric. hort. Res. Sta. Bristol, 1941*, pp. 70–71, [1942].

Outdoor tomatoes growing in England, particularly in the west, are subject to infection by *Phytophthora infestans*. The disease spreads rapidly during wet weather in late summer, and in 1941 unsprayed crops in some localities sustained very severe losses. In one experiment made in that year on 1½ acres of tomatoes, including the Market King, Plumpton King, Radio, and Potentate varieties, very satisfactory results followed a single application in early August of copper oxychloride (400 gals. per acre) though an adjacent, unsprayed crop covering an equal area suffered nearly complete loss. Details are given of the suggested lay-out of the mains over alleyways for use either for watering the crop or conveying the fungicide. The spray is applied at 350 lb. per sq. in. and a hose length of about 75 ft. is recommended.

SMUCKER (S. J.). **Scolytus sulcatus and Apple trees in relation to the Dutch Elm disease control program.**—*Phytopathology*, xxxii, 5, pp. 441–442, 1 fig., 1942.

The results of preliminary investigations during the last two years at Morristown, New Jersey, on the pathogenicity and longevity of *Ceratostomella ulmi* in inoculated wild apple trees [*R.A.M.*, xix, p. 680] showed that in a period of three months (from the beginning of June to early September, 1939), the minimum, maximum, and average distances of spread of the fungus were 5·25, 111·68, and 47·75 in., respectively. The organism was present in the xylem of all the 50 out of 100 inoculated trees examined and in 16 the discoloration extended into the twigs, but no external symptoms of the disease were apparent in any of the trees. On 24th September, 1939, 11 of the infected trunks, which after the first examination had been placed on the ground under dense shade, were found to bear coremia, and from 1st to 3rd October, 1940, *C. ulmi* was isolated in pure culture from the discoloured xylem of 19 out of the 50 trunks that had

been stored on the ground for 13 months. In March, 1941, only two of the trunks yielded the fungus, which must have completely died out soon afterwards, since attempts at its recovery in the following September were unsuccessful. However, samples cut from nine out of ten of the remaining inoculated trees in the same month were found to harbour *C. ulmi*.

None of the 535 maternal galleries of *Scolytus sulcatus* in 107 samples of apple wood collected in New Jersey and New York from points within a radius of 1,000 ft. of diseased elms yielded *C. ulmi* in isolation experiments by J. M. Walter's technique (*Phytopathology*, xxv, pp. 37–38, 1935), nor was the fungus obtained from 14,311 beetles collected on emergence from the infested material and placed in rearing jars. Apple wood harbouring *S. sulcatus* does not appear, therefore, to constitute an important source of inoculum of *C. ulmi*, and may for the present be disregarded in the planning of control programmes.

Urquijo Landaluze (P.). **La enfermedad de la 'tinta' del Castaño y su tratamiento.** [The Chestnut ink disease and its treatment.]—*Agricultura, Madr.*, xi, 118, pp. 54–56, 6 figs., 1942.

The presence of the ink disease of chestnuts in Spain is believed to date from 1726, though the causal organism, *Phytophthora cambivora*, was only described by Petri from Italy in 1917. The life-history of the fungus is briefly summarized, and an account is given of the author's successful method of combating the disease by the treatment of the exposed roots with a copper carbonate or copper oxychloride solution, which since the opening of the campaign in 1934 has been applied to some 2,500 trees [*R.A.M.*, xxi, p. 354].

Smith (G. E. P.). **Creosoted Tamarisk fence posts and adaptability of Tamarisk as a fine cabinet wood.**—*Tech. Bull. Ariz. agric. Exp. Sta.* 92, pp. 222–254, 10 figs., 2 diags., 1941.

This is a progress report on the condition of tamarisk (*Tamarix aphylla*) fence posts treated with creosote by various procedures at the Arizona Agricultural Experiment Station and elsewhere in the State, from which it appears that, judging by the freedom from decay of the wood after five years in the ground, a service life of at least 12 to 15 years may be anticipated.

Hilborn (M. T.). **The biology of Fomes fomentarius.**—*Bull. Me agric. Exp. Sta.* 409, pp. 161–214, 17 pl., 1 fig., 3 graphs, 1942.

Fomes fomentarius [*R.A.M.*, xviii, p. 214] (the synonyms of which comprise 27 binomials) has been reported from most of North America, the British Isles, northern and central Europe, China, Japan, and northern Africa on 23 genera and 56 species of trees. In New England, the fungus is mainly confined to *Betula* and *Fagus* spp., while in Maine it occurs most commonly on *B. populifolia*, *B. lutea*, *B. papyrifera*, and *F. grandifolia* in decreasing order of incidence.

Morphological examination of the sporophore showed that the tube layers are stratified. Basidia were found only in the current year's tube layers. At the end of each season the last tube layer is sealed by a sterile hyphal layer which prevents further spore discharge. In Maine, the spores from white birch measured $25{\cdot}45 \pm 0{\cdot}142$ by $7{\cdot}33 \pm 0{\cdot}025\ \mu$, and those from grey birch $22{\cdot}41 \pm 0{\cdot}106$ by $10{\cdot}34 \pm 0{\cdot}126\ \mu$.

Spore discharge persisted for approximately 180 days, falling into three phases, pre-peak, peak, and post-peak. Atmospheric humidity influenced spore discharge only in the first phase; the effect of temperature was most pronounced in the last, and during the peak period the food reserves of the sporophore apparently influenced discharge.

Twenty-eight isolates from North America and Europe were studied, but showed no evidence of the existence of strains or local races within the species. Isolates from

different hosts or localities showed more variation in growth rate caused by the medium than by the source of the isolate. The range of cultural characters did not fall outside the characters used to separate *F. fomentarius* from other species in the genus. All exhibited mutual aversion when two different isolates were plated together.

The fungus destroyed heart and sapwood at equal rates in cultures. Isolates differed in their ability to cause decay, though such differences resulted from individual variation and were not correlated with any host or locality influence. The fungus causes a white, mottled rot in the heart and sapwood of living and dead trees, principally birch, beech, and poplar. In living trees the heartwood is attacked first, but in dead ones both heart and sapwood are attacked simultaneously. Sporophores are rare on living trees in Maine, only two such being found. The fungus was present in infected wood most abundantly in the wood rays and lumina of the vessels, which were frequently completely filled with closely packed masses of hyphae.

Chemical studies demonstrated that lignin and cellulose were attacked simultaneously. No differences in the utilization of pentosans were evident, but a decrease in alkali solubility of the decayed wood characteristic of the white rots was apparent, while the losses in calorific value were proportional to those in dry weight.

Fritz (Clara W.) & Atwell (E. A.). **Decay in red-stained Jack Pine ties under service conditions.**—*Circ. Dep. Min. Resour. Can.* 58, 19 pp., 12 figs., 1941.

Some 500 railway ties of Jack pine [*Pinus banksiana*] timber affected with red stain [*R.A.M.*, xix, p. 506] were tested by the Forest Products Laboratories, Canada, for the presence of staining fungi immediately after manufacture of the ties in 1926 and after one year's seasoning in 1927; 29·8 per cent. of the cultures prepared from 415 stained samples yielded *Fomes pini* in the first, and 6·8 per cent. in the second year, while 12·5 and 20·4 per cent., respectively, yielded the unidentified organism referred to as fungus No. 2. In the following summer, half the ties were creosoted by the Rüping process and equal numbers of creosoted and untreated ties laid in a main-line railway track. Yearly examinations of the ties during a ten years' service period led to the following conclusions. The red-staining fungi are not responsible for decay of either creosoted or untreated ties under service conditions: in the former they remain viable but dormant, and in the latter they are gradually killed by advancing secondary fungi, being found alive in only about 2 per cent. of some 2,500 tests made at the end of the service period in 1939. An advanced stage of decay, most usually of a cubical type of brown rot, is caused in untreated ties by secondary fungi, most commonly by *Lenzites sepiaria* (isolated from 73 per cent. of the ties examined) and also by *Trametes americana*, *L. trabea*, *Lentinus lepideus*, *Poria vulgaris* sensu Romell, *T. serialis* (Cartwright type), *P. xantha*, one unidentified fungus which was isolated from 6·6 per cent. of ties, and several identified species which did not cause extensive rot. Creosote treatment does not sterilize the ties, but it reduces the viability of the two red-staining fungi. However, after some years, ties are rendered increasingly vulnerable to attack by secondary fungi through checks which open up the untreated wood beneath the creosoted shell.

Danilovski (A.). **Mechanische Auftragung pilztötender Lösungen auf Holz.** [The mechanical application of fungicidal solutions to wood.]—*Stroit. Prom.*, xviii, 11, pp. 40–41, 1940. [Russian. Abs. in *Holz Roh- u. Werkstoff*, iv, 11, p. 407, 1941.]

The author describes a spray pistol for the application of fungicides to wood. Clogging of the apparatus is avoided by the use of two solutions which fall into very fine suspension and do not settle with undue rapidity, viz., (1) 44 per cent. sodium fluoride (43 per cent. is sufficient for less extensive decay), 28·5 (or 28) per cent. sulphite lye, 2·2 (or 2) per cent. peat dust, and 25·5 (or 26·8) per cent. water; (2) 14 per cent. sodium silicofluoride, 16 per cent. sulphite lye, 20 per cent. sodium carbonate, 5 per cent. water glass, and 45 per cent. water.

Vysozki (P. G.). **Industrieabfälle zur Pilzbekämpfung im Holz.** [Industrial wastes for fungal control in wood.]—*Stroit. Prom.*, xviii, 11, pp. 39–40, 1940. [Russian. Abs. in *Holz Roh- u. Werkstoff*, iv, 11, p. 407, 1941.]

The results of experiments with *Coniophora cerebella* [*C. puteana*] cultures showed that both a phenol-containing liquid from shale tar pitch (specific gravity 1·026 to 1·053, tenacity 1·56, alkalinity 3·3 per cent. and containing 4 per cent. crude phenols) and shale tar oils (sp. gr. 1·05, tenacity 1·86, boiling point 95° C., carbon, hydrogen, nitrogen, sulphur, and oxygen contents 75·5, 8·7, 0·6, 6·8, and 9·2 per cent., respectively, and unsaturated carbons 82 per cent.) are sufficiently toxic to protect all parts of buildings specially liable to fungal invasion. A year's practical tests corroborated these observations.

Adams (G. A.) & Ledingham (G. A.). **Biological decomposition of chemical lignin. III. Application of a new ultra-violet spectrographic method to the estimation of sodium lignosulphonate in culture media.**—*Canad. J. Res.*, Sect. C, xx, 2, pp. 101–107, 2 graphs, 1942.

In the present contribution to this series of papers [*R.A.M.*, xxi, p. 277], the authors describe an ultra-violet spectrographic method for estimating the amount of sodium lignosulphonate present in solutions. It was applied to the measurement of lignosulphonate losses in liquid media after fungi had been grown in them, and the results obtained were compared with those given by the β-naphthylamine precipitation method. The spectrographic method gave somewhat lower values than the chemical, but was free from certain errors associated with the latter. The results confirmed earlier observations that fungi are able to decompose lignosulphonates.

Hopkins (J. C. F.) & Cuthbertson (A.). **How to prevent waste. Hints on the control of diseases and pests.**—*Rhod. agric. J.*, xxxix, 3, pp. 192–201, 1942.

Brief recommendations are made for the control of vegetable diseases in Southern Rhodesia by means of sanitary measures, weed removal, and seed treatment, followed by a useful spray schedule in tabular form.

Cook (W. C.). **The Beet leafhopper.**—*Farmers' Bull. U.S. Dep. Agric.* 1886, 21 pp., 11 figs., 1941.

In this study on *Eutettix tenellus* as the vector of sugar beet curly top in the western United States [*R.A.M.*, xix, p. 250; xxi, p. 230], the author states that as the insect is migratory and as the damage is caused by the virus it carries and not by the mass feeding of the insect alone, control by spraying is of value only if effected very soon after the leafhoppers enter a beet field, and before they have had much opportunity to spread the disease. The Bureau of Plant Industry, in co-operation with different beet-sugar companies, has developed several resistant varieties of sugar beets [ibid., xix, p. 131; xxi, p. 316]. These are being widely planted, and losses from curly top have been considerably reduced as a result. The breeding work is still in progress, and new strains are being made available as soon as they are developed. Certain varieties of bean [*Phaseolus vulgaris*], squash, and pumpkin are naturally resistant [cf. ibid., xviii, pp. 84, 296], but sugar beet is the only crop plant for which strains with resistance to curly top have been developed. Attempts are being made to develop tomato varieties and other bean varieties possessing such resistance.

In the Sacramento Valley, California, beets planted in January and February generally escape serious damage from curly top, while March and April plantings are usually severely affected. Experience has demonstrated that in the coastal districts of California, beets planted after the spring movement of the leafhopper will give a successful crop. This procedure is, however, safe only in those areas where summer breeding of the insect is unimportant, as in most localities later broods will attack the beets.

Hertzman (N.). **Klumprotsmittämnet förstöres vid ensilering.** [Club root inoculum is destroyed by ensilage.]—*Landtmannen, Uppsala,* xxv, 12, p. 256, 1941.

This is a summary of the investigations carried out by A. E. Traaen in Norway from 1936 to 1938 and described in *Meld. Norg. LandbrHøjsk.*, 1940, on the destruction of the club-root fungus [*Plasmodiophora brassicae*] in turnips and swedes by means of the AIV ensilage process, involving the sprinkling of the roots (whole or cut) with AIV acid solution at the rate of 2 or 4 l. per 100 kg. prior to placing them in the silo in October. The treated roots were cut up and mixed with sterilized sandy clay soil in pots which were then sown with the susceptible Bangholm Hundsballe swede. On examination in April the treated lots were found to be free from infection, the incidence of which in the control series amounted to 60·6 per cent. The number of spores of *P. brassicae* per gm. of soil in the pots with the treated roots was computed to range from 40,000 to 1,200,000. The ideal mode of combating club root is by the cultivation of immune or highly resistant varieties, and among the ones available on the Swedish market are Weibull's Östgöta II and Holmberg's Göta; these, while not comparable to the standard Immuna [*R.A.M.*, xx, p. 439], are definitely superior to the Bangholm strains, and promising material has been obtained through crossing Immuna with Östgöta II.

Zaumeyer (W. J.) & Harter (L. L.). **A new virus disease of Bean.**—*Phytopathology,* xxxii, 5, pp. 438–439, 1942.

Severely mottled bean [*Phaseolus vulgaris*] pods were found to harbour a virus differing from any of those hitherto recorded; it is tentatively designated as bean mosaic virus 4. Varieties (33 in all) reacting to inoculation by local lesions, consisting of roughly circular, brownish-red, necrotic areas, 1 to 3 mm. in diameter, include Corbett Refugee, Great Northern U.I. No. 59, and Red Mexican U.I. No. 34. Systemic symptoms resembling those associated with bean virus 1 [mosaic: *R.A.M.*, xx, p. 555] developed on 46 varieties, including U.S. No. 5 Refugee, Sensation Refugee Nos. 1066 and 1071, and Robust, while Idaho Refugee was heterozygous for the two sets of lesions. All the varieties mentioned by name are immune from bean virus 1. The systemic features of the new virus on the pods are dark green, irregular, water-soaked, greasy, or slimy blotches on the green-podded varieties and greenish-yellow areas on the wax-podded sorts, slight distortion, subnormal length, and terminal curling. The thermal death point of the new bean virus was found to lie between 90° and 95° C., showing it to be more resistant to heat than any other legume virus as yet described, approximating in this respect to tobacco mosaic. It was further infectious at a dilution of 1 in 500,000 and retained its virulence after 165 days ageing at 18°. It is immunologically remote from bean mosaic.

Harter (L. L.) & Zaumeyer (W. J.). **Downy mildew of Lima Beans in Colorado.**—*Phytopathology,* xxxii, 5, p. 438, 1942.

The appearance, it is believed for the first time, of downy mildew (*Phytophthora phaseoli*) [*R.A.M.*, xix, p. 330] on Lima beans [*Phaseolus lunatus*] in north-eastern Colorado in the summer of 1941, suggests either that the arid regions may sometimes become sufficiently humid for the development of the pathogen, or that the latter can adapt itself to dry conditions. The frequent rains, heavy dews, and cool nights persisting over a lengthy period were exceptional for the State. The losses in fields of the Henderson Bush, Woods Prolific, and Jackson Wonder varieties amounted to between 60 and 75 per cent. The fungus was confined to the pods, both the outside and inside of which harboured an abundance of conidia somewhat larger than those described by Thaxter in 1889; zoospores and oogonia were not detected. The only other western State from which downy mildew has been recorded on *P. lunatus* is California where it occurred many years ago, and it would therefore be of great interest to trace the source of inoculum for the 1941 epidemic in Colorado.

Ogilvie (L.) & Croxall (H. E.). **Observations on downy mildew and grey mould on glasshouse Lettuces.**—*Rep. agric. hort. Res. Sta. Bristol, 1941*, pp. 76–78, [1942].

During the winter of 1941–2, Cheshunt Early Giant, Cheshunt Early Ball, Gotte à forcer, and Early French Frame (Blackpool strain) lettuces growing in a badly heated and an unheated greenhouse became affected by *Bremia lactucae*. No significant differences in susceptibility were noted between the varieties. In the heated house, when temperature conditions were improved (the temperature rising to well over 65° F. during the day) and the lower leaves removed, the disease gave no further trouble. In the cold house the plants also gradually grew away from the disease. In tightly closed frames infection tends to persist on the lower leaves, which should be removed at intervals.

Grey mould (*Botrytis cinerea*) early became prevalent in the heated house owing, it is thought, chiefly to the considerable differences between day and night temperatures resulting in the accumulation of moisture under the lower leaves. Out of 1,536 plants, 98 Gotte à forcer, 88 Cheshunt Early Giant, 78 Cheshunt Early Ball, and 40 Early French Frame (Blackpool strain) were affected. In the cold house all varieties were almost equally affected, and the diseased plants were concentrated in damp spots caused by drips from the roof. Overhead watering of the plants in the warm house in January was followed by an alarming spread of *B. cinerea*.

Zillig (H.). **Wie entstehen Plasmopara-Epidemien?** [How do *Plasmopara* epidemics arise?]—*Z. PflKrankh.*, lii, 2–4, pp. 83–91, 2 diags., 1942.

This is a discussion of the factors concerned in the development of vine downy mildew (*Plasmopara viticola*) epidemics, with special reference to indications for the application of fungicidal treatments [*R.A.M.*, xx, p. 515], based on the author's 20 years' experience at the Bernkastel-Kues (Moselle) branch of the Biological Institute. Generally speaking, the first treatment can safely be left until after the detection of the initial outbreak on the leaves, the writer's protracted observations on this point being confirmed by those of other workers in different parts of the Rhineland and Palatinate. It is thus possible, at any rate in seasons of late infection, to defer the onset of spraying (which nearly always causes a retardation of growth or even actual injury at an early stage in the vegetation of the host) until June, so that only one application need be made before the blossom. On the other hand, it is inadvisable to postpone spraying until after the first signs of infection in the following circumstances: where it is impracticable to utilize the incubation calendar or no warning service is in operation; where the initial appearance of the mildew has not been observed when flowering is imminent; where highly susceptible varieties, e.g., Müller-Thurgau, Gutedel, and Portuguese are grown; where experience has shown that a rainy tendency is liable to develop within a given period after the treatment; and finally, if the organization of labour does not permit of spraying during the later incubation period. In the case of Riesling and other semi-resistant varieties, there is no need, in the absence of any sign of mildew in the neighbourhood, to commence spraying operations until the vines are actually in flower; should infection develop at this stage the resultant damage will ordinarily be insignificant. The year 1936 affords an illustration of these statements: the first indication of an outbreak of *P. viticola* was observed on 22nd June, when the vines were in full bloom, but in spite of the omission over a large part of the experimental zone of a pre-blossom spray, neither Riesling nor a number of other commercial varieties, e.g., several types of Burgundy, white and red Elbling, Portuguese, and Silvaner, sustained any injury; on the other hand, the tips of the first buds of Gutedel and Müller-Thurgau were killed, resulting in a 20 per cent. reduction of the harvest.

Occasionally, late (second half of June) primary infections develop into severe attacks, which may be explained by one of two alternatives: either unsuspected foci

of the disease are present in the vicinity, possibly in the form of abandoned nurseries; or the spores are conveyed to local vineyards by sudden gales from neighbouring districts where weather conditions have been more favourable to the growth of the pathogen. Instances of this kind were observed in 1937 round the Lake of Neusiedl [Austria] (verbal communication from Wahl and Voboril), in 1941 on the Upper Moselle (by Kieffer), and in 1922 in the Palatinate, where Zschokke attributed the epidemic to contamination from the heavily infested vineyards of Baden. Full particulars are given of two cases personally investigated by the writer in 1941, in which infection had spread from small and practically valueless nurseries to the adjacent commercial vineyards, causing substantial losses within a radius of 20 to 100 m.

In connexion with the foregoing observations attention is drawn to the facilities for the spread of downy mildew afforded by the reduction in the incubation period coinciding with the increasing warmth of summer. Thus, from mid-May to the end of June the duration of latency falls from 18 to 6 days, while in July and August the corresponding period is only five days, so that six attacks in a month are theoretically possible, given appropriate temperature and humidity conditions, during the later summer months compared with two in May and three in June. Within these time limits, critical days for infection fall in the latter half of June, when the third to fifth attack is commonly made, and more especially after the blossom at the beginning of July, when the fourth to sixth outbreak may be expected. The next shower following these dates conveys the spores to the young untreated grapes on which the mycelium appears after an incubation period of 10 to 14 days.

However, conditions promoting the development of *P. viticola* on the first buds and berries to the extent described only recur about every decade. On the Moselle, for instance, three out of the last 20 years have fulfilled the necessary requirements, viz., 1922, 1932, and 1941. In 1922, primary infection was observed on 26th June, a few days after the end of flowering; heavy rains in June and July were conducive to attacks on the fruit, resulting in a 'leathery' consistency. A heavy thunder shower on 13th July, 1932, led to the invasion of the young unsprayed grapes, all of which were white with the mycelium of the fungus after a fall of rain on the 30th. In 1941, heavy showers on 12th and 13th July permitted the entry of the organism into the grapes, which were covered with white mycelium after further rain on the 28th. In 1932 and 1941 the flowering periods closed on 3rd and 7th July, respectively, allowing only 10 and 6 days, respectively, for the application of the post-blossom sprays: in the latter year, moveover, many vintners, in consequence of haymaking and war-time exigencies, were unable to complete the necessary control measures during the brief space allotted, with resultant severe losses.

Tartakowsky (S. J.) & Arentsen (S. T.). **La antracnosis de la Vid.** [Vine anthracnose.]—*Bol. Sanid. veg., Santiago,* i, 1, pp. 7–18, 1941.

A fairly severe epidemic of vine anthracnose (*Elsinoe ampelina*) during the season of 1940–1 in Chile (where the disease was first diagnosed in 1876) afforded an opportunity for field investigations in the affected provinces of Ñuble, Concepción, Bío-Bío, Malleco, and Cautín, where the warm and exceptionally humid conditions required by the pathogen prevail. The most susceptible variety was found to be Negra País, constituting 90 per cent. of the total acreage under vines, followed by Blanca de Italia, Moscatel de Alejandría, Rosadá de Curtiduría, Torrontés, and San Francisco, while Cot Rouge showed a fair degree of resistance. Out of a total area of 102,237·45 ha. covered by the vineyards under inspection, *E. ampelina* was found on 22,300·74, causing losses of up to 80 or 100 per cent. Good control may be achieved by a dormant application of 2 per cent. neutral Bordeaux and two spring treatments (or more if weather conditions require) with the same mixture, one when the buds are 10 to 15 cm. long and the second just before flowering.

JENKINS (ANNA E.) & BITANCOURT (A. A.). **Antracnosis de la Vid en Chile.** [Vine anthracnose in Chile.]—*Bol. Sanid. veg., Santiago*, i, 1, pp. 19–53, 3 figs., 1 map, 1941.

Documents and published papers relating to the early history of vine anthracnose (*Elsinoe ampelina*) in Chile [see preceding abstract] and elsewhere are transcribed, and the past and present status of the disease discussed, with special reference to its distribution in Chile.

ALTSTATT (G. E.). **Diseases of plants recorded in Texas since 1933.**—*Plant Dis. Reptr, Suppl.* 135, pp. 37–50, 1942. [Mimeographed]

A list is given, arranged under the Latin names of the hosts, of the plant diseases caused by fungi, bacteria, viruses, or physiological factors, recorded in Texas since 1933. New host plants of the cotton root rot fungus (*Phymatotrichum omnivorum*) found since 1936 [*R.A.M.*, xvii, p. 674] are included.

FAWCETT (G. L.). **Departamento de Botánica y Fitopatología.** *Ex* **Memoria anual del año 1941.** [Department of Botany and Phytopathology. *Ex* Annual Report for the year 1941.]—*Rev. industr. agríc. Tucumán*, xxxii, 1–3, pp. 41–45, 2 figs., 1942.

The following items of interest occur in this report [cf. *R.A.M.*, xxi, p. 5]. The most important sugar-cane disease investigated during the period under review was smut (*Ustilago scitaminea*), which occurs throughout Tucumán, though mostly to a limited extent, as well as in the provinces of Salta and Jujuy, the P.O.J. 36 variety being the most severely attacked, while P.O.J. 213 is little affected.

'Black pest' [spotted wilt: loc. cit.] was not much in evidence among the 1941 tomato crops, appearing only towards the end of the harvest and causing negligible damage. In one plot of 150 plants, 30 were sprayed with wettable sulphur about the end of December, and of these 14 developed symptoms of spotted wilt, and four died; of the untreated, 87 died and all the rest contracted infection. In another bed 56 plants sprayed with lime and a small quantity of adhesive oil (citromulsion) all remained healthy, while 17 of the remaining 49 died. It was experimentally demonstrated that the virus responsible for 'black pest' of tomatoes and 'corcova' of tobacco causes symptoms in the chilli [ibid., xix, p. 255] similar to those on tomato.

Eucalyptus propinqua seedlings, and to a lesser extent those of *E. saligna*, *E. citriodora*, and *E. maculata*, were observed to suffer from a graft-transmissible virus disease characterized by chlorosis and stunting of the foliage. *E. punctata*, *E. tereticornis*, and *E. rudis* are resistant to the trouble, from which *E. dwyeri* appears to be quasi-immune.

GARRETT (S. D.). **The take-all disease of cereals.**—*Tech. Commun. Bur. Soil Sci., Harpenden*, 41, 40 pp., 5 figs., 1942. 2*s.* 6*d.*

In this paper the author reviews and critically discusses the present state of knowledge concerning take-all disease of cereals (*Ophiobolus graminis*), the points dealt with including, among others, geographical distribution, symptoms, physiology, morphology, and pathogenicity, effect of soil and climatic factors on prevalence, life-cycle, origin and dispersal of the disease, effects on the disease of microbiological antagonism and soil temperature and moisture, and, finally, control. A bibliography of 136 titles is appended.

CHESTER (K. S.). **A suggested basis for the prediction of Wheat leaf-rust epiphytotics.**—*Plant Dis. Reptr*, xxvi, 9, pp. 213–217, 1942. [Mimeographed.]

As the outbreak of wheat leaf rust (*Puccinia triticina*) experienced in Oklahoma in 1942 was only a very light one in spite of the fact that it was preceded by weather conditions generally supposed to be conducive to heavy infection (i.e., abundant

inoculum during autumn, a mild winter, and a wet spring), the author made a detailed study of the records of local weather and rust occurrence for the period 1918 to 1941.

These 23 years included eight when losses ranged from 5 to 27 per cent., ten when the figures were 2 to 5 per cent., and five when they were 0 to 2 per cent. In every instance in the first group the winter was mild; precipitation in January and February was normal or above; March temperatures and precipitation were normal or above; and the autumn months and April varied from very warm to cool and very wet to very dry. Conditions favouring leaf rust do not necessarily include excessive rainfall, but the absence of subnormal deficiency of temperature or rainfall during the critical period from December to the end of March appears to be essential. In every year in the second group (moderate infection) one of these factors was lacking (occasionally two); winter temperatures were severe, or March was cool to cold or dry to very dry. When infection was only very light, two or three of the essential factors in the period late winter-March were wanting. In the last two groups the weather experienced in late autumn and April bore no consistent relation to subsequent outbreaks. These observations explain the situation in 1942. Throughout the critical period, temperatures favoured infection, but most of the rainfall came before or after the critical period, January and March being notably dry. Thus, 1942, according to the author's views, would be a year of moderate or light infection, in spite of the excessive moisture and rapid rust development in April.

If the conditions necessary for an epidemic outbreak are fulfilled 2½ months before harvest and losses thereafter are relatively independent of the weather, it should be possible in the latitude of Oklahoma to forecast on 31st March the approximate damage by harvest time in June. This could be done by observation of the rust severity at the time or by analysis of the weather record from December to March, inclusive. For other latitudes correspondingly earlier or later dates would apply. The forecasts would be too late to be of use in control, but early enough to make it possible in years of severe epiphytotics to reduce losses by harvesting the wheat for hay and planting some other crop.

Wark (D. C.). **The influence of storage in contact with certain seed-pickling dusts on the germination of grain.**—*J. Aust. Inst. agric. Sci.*, viii, 1, pp. 22–25, 1942.

Ranee wheat seed, untreated and treated with nine different dusts, was stored for 0, 2, 4, 6, and 8 weeks at 0°, 10°, 20°, and 30° C., all the different lots being sown on the same day. The dusts used, which were all applied at the rate of 2 oz. per bush., were (*a*) and (*b*) two experimental dusts containing 1·5 per cent. of mercury, (*c*) a dust containing 1·5 per cent. of mercury as ethyl mercury phosphate, (*d*) containing 1 per cent. of mercury as ethyl mercury phosphate, (*e*) containing 1·5 per cent. of mercury including 0·15 per cent. as ethyl mercury phosphate, (*f*) agrosan, containing 1·5 per cent. of mercury, (*g*) an experimental dust, the active principle being a sulphur-containing organic compound, (*h*) a mixture of cuprous oxide and talc, and (*i*) copper carbonate.

The results showed that the undusted seed grain stored in closed containers at 0° or 30° gave a significantly lower germination than the undusted stored at 20°. The effects of the dusts were as follows. Without storage, those with ethyl mercury phosphate as the active principle improved germination, (*d*) to a significant extent, (*c*) and (*e*) not. Storage of treated grain, however, reduced percentage germination where (*c*) and (*d*) were used, reduction being more rapid at the higher concentration of ethyl mercury phosphate than the lower. Storage temperature was an important factor in this deterioration. Dust (*a*) applied to wheat seed-grain on the day of planting failed to increase germination; improvement set in with storage, and appeared to be greater at temperatures of 10° or over, but the differences were not significant. Dust (*b*) applied immediately before sowing improved germination. This improvement was significantly reduced on storage, reduction being independent of

the storage temperature. Dust (*h*) significantly improved germination of seed-grain sown on the day it was dusted, in contrast to (*i*), but after two weeks' storage both dusts significantly increased germination. It is concluded that dusts of type (*c*) and to a less extent (*d*) and (*b*) are unsuitable for commercial grain disinfection under South Australian conditions. For testing new materials, a field germination test is recommended, in which dusted grain stored for eight weeks at 30° is compared with undusted and freshly dusted grain.

In a second experiment, Californian Cape barley was stored for 0, 4, 8, and 12 weeks at 10°, 20°, and 30° after dusting (2 oz. per bush.) with (*a*) agrosan, (*b*) ceresan, (*c*) dust (*b*) of the first experiment, (*d*) an experimental dust containing 1·5 per cent. mercury, including 0·15 per cent. as ethyl mercury phosphate, (*e*) a dust containing 1 per cent. mercury as ethyl mercury phosphate, (*f*) a dust containing 1 per cent. mercury as ethyl mercury phosphate, to which indolyl-acetic acid β had been added to give a concentration of 2·5 p.p.m. of the dry weight of the seed, and (*g*) undusted. The treatments were replicated six times. In contrast to the results with wheat, none of the dusts depressed germination even with 12 weeks storage at 30°, and all except (*b*) and (*e*) significantly improved germination after storage.

Millikan (C. R.). **Symptoms of zinc deficiency in Wheat and Flax.**—*J. Aust. Inst. agric. Sci.*, viii, 1, pp. 33–35, 3 figs., 1942.

When Free Gallipoli wheat was grown in zinc-free water cultures at the Plant Research Laboratory, Burnley, Victoria, after three or four weeks the plants were observed to be less tall than the controls, while tillering was reduced, and the youngest leaves were pale green. A few days later, irregular, opaque, greyish-green, collapsed spots appeared on these leaves. The spots soon dried out and became light brown or whitish, the remainder of the leaf finally dying. Growth became very restricted, and later-formed leaves were small and chlorotic. The plants failed to grow beyond the seedling stage, whereas the controls were 4 ft. high at the close of the experiment. The leaf symptoms have not been observed on cereals growing on Wimmera black soil, though zinc sulphate applications have brought about considerable improvement in growth and yield [cf. *R.A.M.*, xxi, pp. 69, 125].

Liral Crown flax grown in the same container as the wheat seedlings usually developed characteristic symptoms about one week earlier. Growth in the water cultures became markedly checked in two to three weeks, and soon afterwards greyish-brown, collapsed spots appeared in the centre or on the lower half of the youngest leaves. These lesions soon dried and turned light brown to white. On later-formed leaves the spots were bronze. Occasionally, these leaf symptoms were preceded by a small bronze spot on the under side of the petiole, at the point of juncture with the main stem. The part of the main stem nearest the affected leaves became rusty-brown, and very little growth occurred above the affected area. The internodes between leaves became very short, giving the top of the plant a rosette-like appearance. Later, the top of the main stem became necrotic, and all the lower leaves dried from the tip downwards, though the stem remained green for some time. Meantime, secondary shoots were produced from the base, the leaves on these shoots developing bronze spotting, followed by necrosis of the leaves from the tip. Finally, the whole plant died. Normal growth was resumed when zinc was applied before the symptoms became very severe. Similar symptoms have been observed on Liral Crown flax growing in Wimmera black soil in the field.

Johnson (F.). **Heat inactivation of Wheat mosaic virus in soils.**—*Science*, N.S., xcv, 2476, p. 610, 1942.

Soil infected with wheat mosaic virus (*Marmor tritici* H.) and at optimum moisture content was passed through a screen of ¼ in. mesh, placed in stoppered test tubes, and heated at 40°, 50°, 60°, 70°, and 80° C. in a water bath for 10 minutes. Seed

of Purdue No. 1 wheat was planted in the treated soil in tin cans and the plants were kept outdoors through the winter. All the plants in the soil heated at 40° and 50° developed mosaic, while all the others remained unaffected.

Livingston (J. E.). **The inheritance of resistance to Ustilago nuda.**—*Phytopathology*, xxxii, 6, pp. 451–466, 2 graphs, 1942.

At the Nebraska Agricultural Experiment Station the inheritance of resistance to the brown loose smut of barley (*Ustilago nuda*) was studied in the hybrid offspring of two susceptible and two resistant varieties [cf. *R.A.M.*, xi, p. 775], the percentages of infected plants in the F_1 of which were as follows: Colsess IV (susceptible) × Trebi (resistant) 6·25, reciprocal 3·51, Trebi × Missouri Early Beardless (susceptible) 1·19, and Missouri Early Beardless × *Hordeum deficiens* (resistant) 0·0. Both Trebi and *H. deficiens* appear from these data to possess a dominant factor for resistance, which may not, however, always be complete. The F_2 progenies from crosses between each of the resistant varieties and Missouri Early Beardless developed a comparable incidence of infection, indicating that the resistance factors carried by the two resistant parents exerted similar effects: in this and succeeding generations resistant individuals preponderated.

The susceptibility of F_2 hybrids from a Colsess IV × Missouri Early Beardless cross (58·97 per cent. infected plants) approached the infection limits of the latter parent but was less than that of the former, denoting the existence of a weak resistant factor in Missouri Early Beardless. The reactions of the F_1 of selfed back-cross offspring corroborated the evidence already secured as to the presence of a single dominant factor for resistance in Trebi and *H. deficiens*.

No correlation could be established between the factors for resistance to loose smut and those governing the hooded and six-rowed characters, promising selections of barleys combining all three of which were developed.

Rosen (H. R.). **Overwintering of crown rust of Oats in Arkansas in 1941–42.**—*Plant Dis. Reptr*, xxvi, 5, pp. 119–120, 1942. [Mimeographed.]

On 3rd March, 1942, *Puccinia coronata* was found on Lee oats at Fayetteville, Arkansas, following a severe outbreak in the same field in the autumn of 1941. By 13th March some of the pustules were shedding uredospores, and the evidence obtained left small doubt that the rust had overwintered in the uredo stage, though the amount of overwintering represented only a minute fraction of the initial number of infections.

Hoppe (P. E.). **Relative prevalence and geographic distribution of various ear rot fungi in the 1941 Corn crop.**—*Plant Dis. Reptr*, xxvi, 6, pp. 145–149, 1 fig., 1942. [Mimeographed.]

This report is on the same lines as those of previous years [*R.A.M.*, xx, p. 528].

Guseff (M.). **Eine neue Maiskrankheit.** [A new Maize disease.]—*Müll. ElevWirtsch.*, *1940*, 7–8, pp. 61–62, 1940. [Russian. Abs. in *Zbl. Bakt.*, Abt. 2, cv, 7–9, p. 158, 1942.]

Stored maize [in the U.S.S.R.] has contracted a new type of infection by species of *Penicillium* [*R.A.M.*, xxi, p. 184], which develop between the embryo and the aleurone layer, inducing a blue or dark discoloration of the former. The minimum moisture content of the grain at which infection can originate is 16·7 per cent.

Schindler (A. J.). **Insect transmission of wallaby ear disease of Maize.**—*J. Aust. Inst. agric. Sci.*, viii, 1, pp. 35–37, 1 fig., 1942.

Late-planted maize in many parts of south-eastern Queensland is affected by a disease, referred to locally as 'wallaby ear'. The first symptoms generally develop

towards the end of January. Crops fully grown at this time may be scarcely affected, but plants that have recently been sown may become a complete loss. Small swellings appear on the secondary veins on the under surface of the top leaves. In young maize the veins rapidly swell from the tip of the leaf to the sheath, the plant is dwarfed and abnormally deep green, pollen yield is reduced, silk growth is slow, and cob and grain growth is much retarded. No organism causing the disease could be found.

In tests of possible vectors, maize plants in four out of five cages exposed to *Cicadula bimaculata* (which was prevalent on affected plants) and *Peregrinus maidis* developed the disease in about three weeks; in two cages exposed to *C. bimaculata* alone it developed in about the same time; and in one cage exposed to *P. maidis* it failed to develop in 18 days. No control plant became affected. It is evident that the disease, which is probably due to a virus, is carried by jassids prevalent after midsummer, and mainly by *C. bimaculata*.

LEUKEL (R. W.). **Spergon as a seed disinfectant.**—*Plant Dis. Reptr*, xxvi, 4, pp. 93 94, 1942. [Mimeographed.]

In May, 1940, seed of Sharon kafir sorghum was inoculated with the spores of covered kernel smut [*Sphacelotheca sorghi*] at a 1-100 spore dosage, treated with new improved ceresan (½ oz. per bush.), copper carbonate (3 oz. per bush.), or spergon [*R.A.M.*, xxi, p. 360 and below, p. 511] (3 oz. per bush.), and planted in the field at Beltsville, Maryland, and Hays, Kansas. In the former locality the three treatments gave, respectively, 0, 0, and 0 per cent. smutted heads, as against 55 per cent. in the untreated controls, and in the latter 0, 1, and 0 per cent. as against 37 per cent. smutted heads in the controls. Seed of 'feterita' and kafir sorghum treated in the same way was also planted in the greenhouse, when the treatments gave 62, 62, and 75 per cent. emergence for 'feterita' (as against 44 per cent. for the control) and 87, 87, and 88 per cent. emergence for kafir, as against 80 per cent. for the control.

KULKARNI (G. S.). **Ergot in India.**—*Curr. Sci.*, xi, 6, p. 246, 1942.

Referring to a recent note on sorghum ergot (*Sphacelia sorghi*) [? *Claviceps pusilla* or *C. purpurea*] in India [*R.A.M.*, xxi, p. 206], the writer states that the first collection of the fungus was made by him at Dharwar in 1915, and may now be inspected in the herbarium of the Poona Agricultural College, infection being subsequently observed on *Andropogon annulatus*, *A. caricorus*, *Ischaemum pilosum*, and *Pennisetum alopecuros*. In the Bombay Karnatak the organism is prevalent and injurious, especially on late-sown sorghum. On *P. alopecuros* the dark, sticky, bent sclerotia are prominent.

G. W. Padwick states in a footnote that the first description (as distinct from a mere record of discovery) of *S. sorghi* was published by McRae in 1917, the spore measurements of his specimen being given as 7·6 to 16 by 4 to 6 μ as compared with a maximum of 3·6 to 11 by 1·8 to 4·6 μ for the Simla hill collections.

CROSS (W. E.). **Actividades de la Sección Fomento Agrícola durante el segundo semestre de 1941.** [Work of the Division for Agricultural Promotion during the second half of 1941.]—*Publ. Estac. esp. agríc. Tucumán* 19, 14 pp., 1941.

In connexion with a report on a citrus exhibition organized by the Rural Society of Jujuy, Argentine, in July, 1941, mention is made of the devastation caused in the orange and grapefruit groves of Entre Ríos and Corrientes by root rot [*R.A.M.*, x, p. 24], the disease being described as a 'scourge' of trees grafted on the sour orange stocks introduced with successful results for the control of gummosis [*Phytophthora citrophthora* and *P. parasitica*: ibid., xix, p. 341]. So far, the causal organism of root rot has not been established, and the only known remedy consists in the substitution of Persian and Rangpur limes for sour orange as stocks. Other destructive citrus

maladies include 'lepra explosiva' [ibid., xv, p. 14] and cancrosis B or false canker, the effects of the second of which may surpass those of all the other troubles enumerated.

RHOADS (A. S.). **Growing new root systems by soil banking—a promising method of rejuvenating trees attacked by root diseases.**—*Phytopathology*, xxxii, 6, pp. 529–536, 3 figs., 1942.

For the last 15 years at the Florida Agricultural Experiment Station the author has successfully combated foot rot (*Phytophthora parasitica*) in orange and grapefruit and root rot (*Clitocybe tabescens*) [see below, p. 497] in Australian pine (*Casuarina lepidophloia*) and other trees and shrubs by banking clay soil round the base of the trunk to a height of 15 to 18 in. to stimulate the natural tendency of the parasitized host to adventitious root development as a means of overcoming the disease, this process occupying a period ranging from two to five years. In some cases it may be advisable to combine the soil-banking method with previous surgical treatment, disinfection, and aeration. The operations under discussion afford the sole practicable means of saving old sweet seedling orange trees in which foot rot has induced such extensive deterioration as to preclude success by the standard practices of rejuvenation.

LOEST (F. C.). **'Dry root rot' disease of Citrus trees.**—*Fmg S. Afr.*, xvii, 196, pp. 420–424, 5 figs., 1942.

A condition known locally as 'dry root rot' has caused the retrogression and death of citrus trees throughout the Union of South Africa. A permanently wilted condition of the leaves develops on certain sections of the tree or over the whole of it, the affected branches showing complete defoliation. Sectional defoliation may continue for years before the entire tree loses its leaves and dies. Sometimes, the tree wholly or partially defoliates without showing any permanent wilt, such defoliation lasting either a short or a long time. In the latter case, the foliage gradually 'thins' and small, mottled leaves often develop on the defoliating branches. This 'thin' condition is often due, however, to faulty nutrition and not to dry root rot. Gum exudation from cracks in the bark of dying-back twigs and branches is characteristic of Triump grapefruit trees affected by dry root rot. The last remunerative crop borne is generally a heavy one. In the early stages of the disease, the fibrous root system sloughs off, and the long secondary roots have no fibrous roots, and eventually decay. The crown roots next become affected, and the bark on the trunk splits and cracks, partially or completely collapsing over the whole trunk or part of it. The appearance of the affected fibrous secondary and crown roots is similar, the bark becoming detached from the main cylinder and readily removable in long shreds. Death of the bark is followed by the death of the cambium and wood. At first, the bark is soft and moist, but later it becomes dry and brittle, while the wood underneath is dead and hard, and eventually becomes corky and powdery. When the roots show an advanced stage of the rot, the bark (except the epidermal layer), the cambium, and the wood become biscuit-coloured, light brown, light dirty brown, pepper- or blackish-grey. The bark, except the epidermal layer, is often almost black to jet-black, the black bark frequently adhering as a crust.

Proof was obtained that the causal agent is *Diplodia natalensis* [*R.A.M.*, xxi, p. 128]. Contributing factors are (1) impaired soil aeration, due to over-irrigation especially of heavy soils or over hard pans or impervious subsoils, (2) a low nitrogen level, due to the same cause, and (3) the planting of weak trees or excessive root pruning.

Control consists in not planting trees in soils with an impervious subsoil, not cultivating the soil before it is sufficiently dry, avoiding any excessive supply of water

and the severance or bruising of roots, and supplying a sufficient amount of available nitrogen. In advanced stages control is often impossible.

Dastur (J. F.). **Pink disease of Orange trees in the Central Provinces.**—*Indian J. agric. Sci.*, xi, 6, pp. 892–901, 3 pl., 1941 (issued 1942).

Pink disease (*Corticium salmonicolor*) of oranges appears to be confined to four districts in the Central Provinces, in only one of which (Balaghat) does it occur in epidemic proportions. The fungus may assume various forms, including those known as the 'spider's web', sterile pustular, *Necator decretus* [*R.A.M.*, vi, p. 125], and basidial. The silvery-white, later pink, and finally dirty drab mycelium of the 'spider's web' stage is mainly superficial, penetrating the bark only through wounds; the thin-walled, sparsely septate hyphae, 7 to 15 μ in breadth, form loose aggregates of cells over thin-walled lenticels and ruptured tissues. The sterile pustules may be either white or pink to orange-reddish, the former developing both on the exterior of the cortex and within the bark tissues, while the latter originate in the subepidermal layers. The *N. decretus* pustules at first resemble the sterile structures, but are readily distinguishable from the latter on the production of unicellular, hyaline (pink in the mass), angular or rounded spores, 8 to 20 by 5 to 10 μ, which are formed by the separation of the cells composing the pseudoparenchymatous tissue. On rare occasions the basidial stage is formed; the basidia, 16·6 to 33·2 by 5 to 8 μ in diameter, are developed from the hymenium in rows or scattered, but remain sterile, bearing neither sterigmata nor basidiospores.

Dormant mycelium of *C. salmonicolor* has been observed in the callus surrounding cankers in the cortical tissues of a fork while a *Nectria* and a *Diplodia* species are associated with the disease. The mycelium of the *Diplodia* develops inside the cortex, and the pycnidia arising from the stromata in the bark tissues rupture the epidermis. It is not improbable that primary infection by *C. salmonicolor* may be in part through bark killed or weakened by *Diplodia* sp.

The inoculation of two- to three-year-old orange and sour lime trees at Nagpur with pure cultures of *C. salmonicolor* isolated from orange and mango gave positive results, but there was no spread of infection during the subsequent wet season to healthy plants in the same greenhouse, or even to the sound limbs of the inoculated trees.

Control measures should consist in the excision of cankers during the dry weather and the application to the wounds, and also to the forks of the trees, of a standard fungicide, such as creosote oil or Bordeaux paste.

Presley (J. T.). **Cotton rust in Arizona.** –*Plant Dis. Reptr*, xxvi, 6, pp. 144–145, 1942. [Mimeographed.]

During 1941 cotton rust (*Aecidium gossypii*) [*R.A.M.*, xxi, p. 253] was present over a large area in Arizona, the outbreak being favoured by the prevailing weather conditions and the increased acreage of cotton on desert land. The *Boutcloua* grasses, which are alternate hosts of the fungus, are native to the south-west parts of the United States and may be expected to grow abundantly on most desert lands when water is supplied, either by irrigation or rainfall. On ditch banks and in cotton fields where moisture is available the grass will grow for most of the summer, and reach a size many times that found in the desert; it is on this grass, in and immediately surrounding the cotton field, that most of the rust inoculum is built up. Directly a rainy period sets in, the teleutosori on the infected grass germinate and the cotton becomes diseased. Grass in a cotton field may be attacked early in the summer and re-infect the same field later in the same growing season, if weather conditions are favourable; teleutosori forming on the grass soon after infection are at once viable and may germinate within 48 hours.

The following suggestions are made to assist in control. Dead, rusted grass in and

round cotton fields should be destroyed by burning where possible, before the arrival of the summer rains, and improved sanitary practices instituted, especially with regard to ditch and fence rows. Fungicidal treatment, though possible, would be expensive and difficult.

Drechsler (C.). **New species of Acaulopage and Cochlonema destructive to soil amoebae.**—*Mycologia*, xxxiv, 3, pp. 274–297, 6 figs., 1942.

In this paper [cf. *R.A.M.*, xx, p. 462], full descriptions are given of three conidial Phycomycetes, apparently not before described, destroying particular species of terricolous amoebae. Two are presented as new members of the predaceous genus *Acaulopage* [ibid., xiv, p. 508], viz., *A. lasiospora* n.sp. and *A. gomphoclada* n.sp., while the third is set forth as a new member of the parasitic genus *Cochlonema* [ibid., xiv, p. 360], *C. euryblastum* n.sp. A morphological variant of *C. bactrosporum* is described as a new variety, *C. bactrosporum* var. *longius* var. nov. Supplementary findings are reported on the vegetative stage of *A. tetraceros* and on the asexual reproductive stage of *Stylopage cephalote* [ibid., xvii, p. 597].

Costa (G. A.). **Nota sôbre a conservação de cogumelos pelo dessecamento.** [Notes on the preservation of fungi by desiccation.]—*Rev. bras. Biol.*, i, 2, pp. 155–159, 1941. [English summary.]

The writer's experiments at the Oswaldo Cruz Institute, Rio de Janeiro, showed that a number of dermatophytes and yeasts could be maintained in a viable condition without undergoing pleomorphism for periods up to ten months by desiccation in vacuum at low temperatures.

Tager (M.) & Liebow (A. A.). **Observations on histoplasmosis: induced infections in the Mouse.**—*Yale J. Biol. Med.*, xiv, 5, pp. 469–488, 15 figs., 1942.

A thoroughly documented survey of the increasingly important disease of histoplasmosis (*Histoplasma capsulatum*) precedes this detailed account of the author's inoculation experiments with mycelial suspensions of the fungus from honey agar on mice, the pathological changes induced in which are essentially analogous to those associated with the advanced process in man. A bibliography of 44 titles is appended.

Key (J. A.) & Large (A. M.). **Histoplasmosis of the knee.**—*J. Bone Jt Surg.*, N.S., xxiv, 2, pp. 281–290, 4 figs., 1942.

Full clinical details are given of a case of histoplasmosis (*Histoplasma capsulatum*) of the knee in a 47-year-old male patient at the Barnes Hospital, St. Louis, Missouri, believed to be the first on record of involvement of a joint. A further point of interest lies in the resemblance of the symptoms to those of tuberculosis, a diagnosis of which was made but rejected on the negative outcome of tuberculin tests and guinea-pig inoculations.

Conant (N. F.). **Laboratory study of Blastomyces dermatitidis Gilchrist & Stokes, 1898.**—*Proc. sixth Pacif. Sci. Congr., 1939*, pp. 853–861, 3 figs., 1939. [Received August, 1942.]

The importance of fungi as causative agents of disease in man is apparent when it is stated that the American blastomycosis (Gilchrist's disease) has a higher mortality than tuberculosis. Although a tentative diagnosis of the disease may be made on the basis of large double-contoured budding cells in the sputum, urine, spinal fluid, etc., final diagnosis can only be established by isolating the causal organism *Blastomyces dermatitidis* [*R.A.M.*, xxi, p. 370]. Several fungi may be cultured from blastomycotic lesions, but it is the purpose of this paper to show that *B. dermatitidis* Gilchrist & Stokes, 1898, is the etiologic agent.

After further reviewing the literature the author reports his studies on cultures isolated at the Duke Hospital, North Carolina, and various named cultures received

from other workers. The pure cultures were obtained by streaking infected material on Sabouraud's glucose agar and blood agar and making transfers from suitable colonies. All the strains were allowed to develop cottony filamentous growths on Sabouraud's glucose agar at room temperature, heavy transfers were made on blood agar slants at 37° C., and within seven to ten days yeast-like areas appeared which on transference to fresh blood agar slants at 37° developed into glistening, sometimes smooth but often heaped, cerebriform, yeast-like cultures, containing budding cells similar to those found in lesions. When the yeast form on blood agar at 37° was transferred to Sabouraud's glucose agar at room temperature the mycelial growth ultimately became dry and cottony and coremia appeared, giving the cultures a prickly appearance. Eventually the entire culture became cottony. In both the prickly and filamentous stages numerous conidia were produced. These were either sessile, round to oval, 3 to 4 μ in diameter and attached to the hyphae near the septa, or round to piriform, 4 to 5 μ in diameter, and borne on lateral sterigmata of varying lengths. Many raquette cells were also present. In the old filamentous cultures many intercalary and terminal chlamydospores were seen. These were brown, thick-walled, 7·5 to 18 μ in diameter, and in many the outer walls were thickened to simulate sculpturing and closely resemble the chlamydospores of *Scedosporium apiospermum*. Intraperitoneal inoculations of the yeast form into mice rapidly proved fatal.

Fungi previously described as *Glenospora gammeli* (1927), *Blastomycoides tulasnensis* (1928), *Endomyces capsulatus* (1929), *E. c.* var. *isabellinus* (1933), *E. dermatitidis* (1933), and *G. brevis* (1933) were found by the author to be identical with *Blastomyces dermatitidis* and should be reduced to synonymy. The author admits that the genus *Blastomyces* had been erected by Costantin and Rolland in 1888 for *B. luteus*, but he considers that confusion would be avoided if the name *B. dermatitidis* were retained until some definite agreement can be reached on the point. In a personal communication from Ciferri and Redaelli referred to in the bibliography these authors stated that their descriptions were based entirely on Moore's work [ibid., xiv, p. 582].

Muskett (A. E.) & Colhoun (J.). **Biological technique for the evaluation of fungicides II. The evaluation of seed disinfectants for the control of seed-borne diseases of Flax.**—*Ann. Bot., Lond.*, N.S., vi, 22, pp. 219–227, 1942.

In the second contribution to this series [*R.A.M.*, xvii, p. 809] results are given of a comparison between a laboratory and a field method of evaluation of seed disinfectants for the control of stem-break and browning (*Polyspora lini*) and seedling blight (*Colletotrichum lini*) [ibid., xx, p. 335] of flax. The laboratory technique was an adaptation of the Ulster method previously described by Muskett and Malone [ibid., xx, p. 261], but the time of incubation of the plates was increased from five to seven days. The field method consisted in sowing disinfected seed in randomized blocks and making frequent observations on the development of disease during the growing season. The fungicides used were formalin (1 in 50, 60, 70, or 80), cuprous oxide and several proprietary materials containing organically combined mercury or tetramethylthiuram disulphide [ibid., xxi, p. 283].

Data collected during the experimental years from 1939 to 1941 showed a close agreement between the results obtained by the two methods. The correlations of the mean values obtained for treatment in the field with the corresponding ones arrived at in the laboratory were all statistically highly significant. It is concluded that the evaluation of seed disinfectants by the laboratory technique may be regarded as reliable and accurate.

Straib (W.). **Beiträge zur Epidemiologie und Bekämpfung des Flachsrostes.** [Contributions to the epidemiology and control of Flax rust.] *Angew. Bot.*, xxiv, 1–2, pp. 16–30, 1942.

The causal organism of flax rust, *Melampsora lini*, was shown by field experiments

near Brunswick and in East Prussia [*R.A.M.*, xix, p. 280] in 1940–1 on the Lusatia and Bavarian Mountain varieties to traverse its entire life-cycle on the same host. The diseased straw yielded, in addition to physiologic race D–1 (found occurring spontaneously in 1938 on the Gliesmarode experimental plots and differing from all recorded European races of the rust in its high maximum temperature for uredospore germination, namely 30° C. as against 25° to 27° for the rest), a new race, herein designated D–16, which is characterized by severe pathogenicity to the ordinarily resistant Kenya variety, as well as to 'very pale blue crimped' and other sorts resistant to D–1. On the other hand, no variety was observed, among the 400 tested, to show a higher degree of resistance to D–16 than to D–1, the new race, therefore, as in the case of *Puccinia glumarum* on wheat, representing a progressive intensification of 'aggressiveness' [ibid., xvi, p. 372 *et passim*]. In its temperature relations D–16 agrees with D–1, from which it is presumed to have sprung through the recombination of genes incidental to heterothallic fungi [ibid., xiv, pp. 170, 309]. The removal of infected flax straw from the field (which is assisted by the cultivation of a winter crop in succession to flax) thus assumes great importance as a control measure against the rust, but more significant still are the possibilities of breeding resistant varieties, some experiments in connexion with which have already been reported (*Arb. biol. Anst.* (*Reichsanst.*), *Berl.*, xxiii, pp. 233–263, 1941; *Faserforsch.*, xiv, pp. 97–113, 1941). Many varieties with susceptible foliage have been observed to possess resistant stems, and for all practical purposes the capacity to withstand infection of the latter organs is quite sufficient, since damage to the fibres occurs mostly from the teleutosori forming crusts over the stem surface. Among such varieties may be mentioned Svälofs Hercules, Concurrent, and Karnobat No. 9, the last-named an oil-yielding sort. Estanzuela 117 is uniformly resistant from the seedling stage onwards, whereas Eckendorfer Early, Lusatia, and Bavarian Mountain are altogether susceptible. This resistance of the stems to *M. lini* appears, from experimental data obtained of recent years, to be largely independent both of physiologic specialization within the rust and of environmental conditions.

WATERHOUSE (W. L.) & WATSON (I. A.). **A note on determinations of physiological specialisation in Flax rust.**—*J. roy. Soc. N.S.W.*, lxxv, 3, pp. 115–117, 1 pl., 1942.

Determinations of ten collections of *Melampsora lini* [*R.A.M.*, xxi, p. 454] from widely separated areas in Australia showed the presence of only one physiologic race, the reactions to which of 11 differential varieties of flax proved it to be different from any of the races recorded by Flor [ibid., xix, p. 655]. This was corroborated by Flor in personal correspondence. Further, the variety Bison C.I. No. 389 remained immune in all the authors' tests, though it was susceptible throughout the American experiments. In addition, the variety Argentine C.I. No. 705–1 which was used by Flor and supplied by him to the authors, remained immune in Australia, though immune only from race 10 in America; the reactions of this race on other differentials of the group were totally different from those of the authors' race. Further work is in progress.

D'OLIVEIRA (MARIA DE L.). **Um virus das Liliaceae em Portugal.** [A virus of Liliaceae in Portugal.]—*Agron. lusit.*, iii, 2, pp. 115–120, 1 pl., 1941. [English summary.]

Attention has already been drawn to the occurrence in Portugal of a virus disease of onions, grape-hyacinth (*Muscari comosum*), and *Narcissus tazetta* characterized by symptoms resembling those of yellow dwarf [*R.A.M.*, xxi, p. 243], which were transmitted by rubbing, using carborundum as an abrasive, from diseased to healthy plants in a very low percentage of cases. Onions being raised almost exclusively from seed in Portugal, it is considered unlikely that the disease will become widespread, since the virus is perpetuated mainly through the bulbs.

D'Oliveira (B.) & Borges (Maria de L. V.). **Infecções perenais da Tranzschelia pruni-spinosae Pers. na Anemone coronaria.** [Perennial infections of *Tranzschelia pruni-spinosae* Pers. on *Anemone coronaria*.]—*Agron. lusit.*, iii, 1, pp. 71–77, 1941. [English summary.]

The writers' experiments, carried out in the greenhouse in Lisbon with material from Cambridge, England, showed that corms of *Anemone coronaria* infected by *Tranzschelia* [*Puccinia*] *pruni-spinosae* [*R.A.M.*, xxi, p. 243] when planted in the early autumn, gave rise to an abundance of leaves on which pycnidia, and later aecidia, developed from the end of March onwards. The mycelium perennating in the corms is consistently uninucleate, the binucleate phase being present in the aerial organs. Evidence of heterothallism is adduced from inoculation tests with spermatia of the rust, the development of which in nature appears to be governed by temperature conditions: in experiments on the treatment of the infected *Anemone* rhizomes by heat, a temperature of 34° C., maintained for four days, sufficed to kill *P. pruni-spinosae* without injuring its host.

Ocfemia (G. O.), Macaspac (I. S.), & Yuan (H. F.). **Experimental transmission of the mosaic of Canna indica.**—*Philipp. Agric.*, xxx, 5, pp. 357–370, 2 pl., 1942.

The mosaic disease of *Canna indica*, first observed in Davao, Philippine Islands, in 1937 [*R.A.M.*, xvii, p. 40], resembles that of abacá [*Musa textilis*], being characterized by the development on the leaves of irregular, pale yellow stripes running parallel with the veins and extending from the midrib to the margin. The affected foliage is more or less wrinkled and curled, and the chlorotic areas often turn rusty-brown. The stems, sepals, and petals may bear yellowish bands, while the fruit displays an indistinct mottling. The *Canna* virus is transmissible to *M. textilis* by *Aphis gossypii* and *A. maidis*, the former vector also being able to convey the mosaic from *C. indica* to *C. edulis* and to two ornamental *Canna* varieties. Neither *A. gossypii* nor *Rhopalosiphum nymphaeae* can, however, transmit abacá mosaic [ibid., xx, p. 465] to *C. edulis* and the horticultural varieties. *A. gossypii* can communicate *C. indica* mosaic to abacá seedlings after some five minutes' feeding on the former host, five individuals of the aphid sufficing to effect the transmission. Therefore, whether or not the virus is identical in the two hosts, mosaic-infected *C. indica* serves as a source of inoculum for infecting abacá with mosaic disease. A viruliferous *A. gossypii* loses all its virus while feeding on the first abacá plant, and an hour in a test-tube after feeding on mosaic *Canna* destroys its capacity to infect *M. textilis*. *A. laburni*, *Pentalonia nigronervosa*, and *R. nymphaeae* do not act as carriers of *Canna* mosaic.

Takimoto (S.). **Bacterial leaf spot of Cissus japonica Wild.**—*Ann. phytopath. Soc. Japan*, ix, 1, pp. 41–43, 1 fig., 1939. [Japanese. Abs. in *Biol. Abstr.*, xvi, 6, p. 1454, 1942.]

Aplanobacter cissicola, causing a black leaf spot of *Cissus japonica*, is described [in English] as a non-motile, Gram-negative rod with rounded ends, occurring singly or in pairs, measuring 1 to 2 by 0·5 to 0·9 μ, and forming capsules but not spores. On potato-extract agar the colonies are circular, convex, smooth, and dirty white. The organism produces slight clouding of beef bouillon, followed by precipitation of pellicle and rim. Gelatine is not liquefied, and milk is digested without coagulation. Good growth is made in Uschinsky's solution, with the formation of pellicle, green pigment, and increased viscidity. The organism is strictly aerobic, does not reduce nitrates, produces neither hydrogen sulphide nor indol, does not digest starch, or form acid or gas from sucrose, glucose, lactose, or glycerine. Salt toleration is 3 per cent., and the minimum, maximum, and optimum growth temperatures are, respectively, 10°, 35°, and 30° C., while the thermal death point is between 49° and 50°. It is pathogenic to *C. japonica* only.

Pape (H.). **Die Alternaria-Krankheit der Zinnie und ihre Bekämpfung. (Alternaria zinniae n.sp.).** [The *Alternaria* disease of the Zinnia and its control. (*Alternaria zinniae* n.sp.).]—*Angew. Bot.*, xxiv, 1 & 2, pp. 61–79, 6 figs., 1942.

During the past four or five years the writer has observed in various parts of Germany the development of the *Alternaria* disease of the *Zinnia* (chiefly *Z. elegans* and *Z. haageana*), which has been widely substituted by market-gardeners and horticulturists in general for the China aster in soils where the latter suffers from wilt [*Fusarium conglutinans* var. *callistephi*]. The fungus responsible for the trouble under observation does not appear to agree with the species of *Alternaria* previously recorded on the same host in the United States, Holland, and Denmark [*R.A.M.*, xvii, p. 96], or with *Macrosporium caudatum* from the last-named country [the U.S.S.R., and (?) England: ibid., ii, p. 488; vii, p. 787; xviii, p. 654]. The fungus in question is accordingly regarded as a new species and designated *Alternaria zinniae* n.sp. [without a Latin diagnosis]. It is characterized by [ob]clavate conidia of a faint yellowish-brown tinge (except for a hyaline, filiform, terminal cell measuring 1½ times the length of the spore proper), with 3 to 12 transverse and 0 to 9 longitudinal, muriform septa (average 6 to 8 and 4 to 6 respectively), 75 to 253 by 14 to 27 (128 by 19)μ, borne for the most part singly on 2- to 6-celled, brown conidiophores, 40 to 65 by 6 to 8μ, or terminally or laterally on branches of the mycelium.

The fungus forms on both leaf surfaces irregular, scattered, often somewhat serrated, dark brown, sometimes purplish-red-bordered, dry spots, 0·5 to 1·5 cm. in diameter, occupied in the centre or elsewhere by a whitish-grey patch, 1 mm. in diameter, in which the tissues are completely shrivelled and bleached. The lower, older leaves are the first to contract infection, which may, however, in severe cases extend to the younger foliage nearer the top of the plant, to the stems, and to the inflorescences, the labiate flowers of the last-named being covered with similar lesions to those observed on the laminae. This phase of the disease, which reaches a climax during the late summer, so disfigures the plants as to render them unfit for sale. *A. zinniae* is also the cause of a seedling rot of the damping-off type, frequently resulting in losses amounting to 40 to 60 per cent. of the stand. The cotyledonary leaves bear large, brown to black spots whence infection evidently spreads upwards to the lower, and ultimately to the upper foliage.

Samples of seed from three localities in Germany as well as from France and the United States were found to contain conidia of *A. zinniae*, 30 to 65 per cent. of which were germinable in tap water. Plants raised from these samples in the greenhouse at the Kiel branch of the Biological Institute (for diseases of ornamentals) in 1938 were largely infected by the disease under observation.

Inoculation experiments with aqueous spore suspensions of the fungus on wounded and unwounded *Zinnia* leaves gave positive results, whereas a number of other plants reacted negatively. On injured foliage the spread of infection was expedited and inoculations were successful under comparatively dry conditions. The development of *A. zinniae* was shown by pot tests to be promoted by an excess of nitrogen and a deficiency of potash. The conidia of the fungus were killed by 15 minutes' immersion in 0·125 per cent. fusariol, 0·125 per cent. germisan, and 0·25 per cent. uspulun, and by half an hour in 0·125 per cent. abavit, but all these preparations, with the exception of uspulun, reduced the viability of the seed by 30 per cent. and upwards. Where fungicidal treatment is to be carried out, therefore, extra quantities of seed should be provided to compensate for eventual losses. Cultural measures likely to contribute to the control of the disease include a sparing use of nitrogenous manure, a plentiful potash supply, the use of resistant varieties, e.g., Eldorado and Cherry Queen, thorough clearing of the beds and burning of refuse in the autumn, and a regular change of site.

Sprague (R.). **A revised check list of the parasitic fungi on cereals and other grasses in Oregon.**—*Plant Dis. Reptr, Suppl.* 134, pp. 1–36, 1942. [Mimeographed.]

This list of fungal diseases of cereals and grasses in Oregon combines the two similar lists already issued [*R.A.M.*, xvii, p. 380] and makes a number of additions to them. It includes 677 citations of fungi on separate hosts.

Sprague (R.). **An annotated list of the parasitic fungi on cereals and other grasses in Klickitat County, Washington.**—*Plant Dis. Reptr*, xx, 10, pp. 228-240, 1942. [Mimeographed.]

This list comprises 28 genera of fungi, including at least 73 recognized species and varieties, and a total of 191 host pathogen combinations, based on 327 collections from 53 Gramineae [cf. preceding abstract] made in the course of cereal disease investigations from 1929 to 1940 [cf. *R.A.M.*, x, p. 744], mostly along the Evergreen Highway from Bingen to Goldendale or in the neighbourhood of High Prairie, Washington.

Hardison (J. R.). **Grass diseases in Michigan in 1941.**—*Plant Dis. Reptr*, xxvi, 3, pp. 67–75, 1942. [Mimeographed.]

In the introduction to this list of diseases of grasses observed in Michigan in 1941, the author states that *Stagonospora bromi* caused a serious leaf, sheath, and stem spot of several species of *Bromus*, and was by far the most destructive disease found on brome grasses. It reached epidemic proportions, though previously seldom reported from the United States *Darluca filum* [*R.A.M.*, xx, p. 570] was commonly present on *Puccinia coronata*. *P. graminis*, *P. montanensis*, *P. poae-sudeticae*, and *P. rubigo-vera*. With *P. graminis* the parasite appeared to cause notable reduction in rust development, and many cases of unusual leaf and stem spot symptoms were due to heavily parasitized stem rust infections, which in some instances were able to sporulate only very slightly or not at all. Powdery mildew (*Erysiphe graminis*) was very serious on *Poa palustris* in May and June, completely killing the current growth. Only slight recovery occurred during the autumn rains. *Piricularia grisea* [ibid., xvi, p. 195] and *Cercospora setariicola* together caused considerable defoliation of *Setaria lutescens*. The 'bends' disease [ibid., xx, p. 584] (cause undetermined) is reported for the first time on *B. arvensis*, *B. japonicus*, *B. mollis*, *B. secalinus* var. *velutinus*, *B. tectorum* var. *glabratus*, *Hordeum murinum*, *Poa pratensis*, and *Scleropoa rigida*.

Parker (D. L.). **A note on 'perennial' Prairie Grass.**—*J. Aust. Inst. agric. Sci.*, viii, 1, pp. 29–30, 1942.

Eight types of prairie grass (*Bromus unioloides*) from Australian and overseas sources were studied in South Australia under single-plant conditions and in grazed swards. Type VI gave the highest yields in grazing trials both at the Waite Research Institute, Adelaide (rainfall 22·5 in.), and on an irrigated reclaimed swamp at Murray Bridge, South Australia. All material of this type remained completely immune from attack by *Ustilago bromivora* [*R.A.M.*, xix, p. 156] which often reduces or prevents seed production in prairie grass. 'Perennial' prairie grass has been produced on a commercial scale in Tasmania for the past ten years, but it is not known whether it has remained free from contamination. The immunity from smut referred to applies strictly only to the six samples received at the Waite Institute.

A new fungicide : thiosan.—*Parks, Golf Courses, Spts Grnds*, vii, 11, p. 129, 1942.

This paper (an abstract from *Greenkeepers' Reptr, U.S.A.*) reports further successful results in turf nurseries and on 18 playing greens in Delaware and New Jersey in tests with tetramethyl thiuramdisulphide for the control of brown patch [*Corticium solani*] and dollar spot [*Sclerotinia homoeocarpa*] of Washington, Metropolitan,

Colonial, and Velvet bent grass [*Agrostis stolonifera*: *R.A.M.*, xxi, p. 383]. The new proprietary product, shortly to be placed on the market under the name of 'thiosan', was shown by comparative experiments to exert approximately the same fungicidal action as special semesan. Weekly applications of the sulphur compound for six weeks induced neither yellowing nor retardation of growth in the treated turf.

Colwell (W. E.) & Lincoln (C.). **A comparison of boron deficiency symptoms and Potato leafhopper injury on Alfalfa.**—*J. Amer. Soc. Agron.*, xxxiv, 6, pp. 495–498, 1 col. pl., 1 fig., 1942.

The results of greenhouse and field studies, the former at the Cornell Agricultural Experiment Station and the latter at two localities in north-central New York State, on the differences between boron deficiency symptoms and those of potato leafhopper (*Empoasca fabae*) on lucerne [*R.A.M.*, xxi, p. 143] indicated that one of the most valuable criteria of separation is the distribution of the yellowing or reddening, that due to the insect being uneven, while signs of boron starvation are confined to the terminals. A shortening of the terminal internode is constantly associated with boron deficiency but does not accompany even severe leafhopper injury, while another exclusive feature of boron deficiency is the death of the terminal bud. The type of yellowing alone is an insufficient means of differentiation, though the leafhopper discoloration tends to present a streaky appearance and often develops on the distal portion of the leaflet in the shape of a 'V'. Leafhopper reddening is inclined to assume a more purplish cast than that due to boron deficiency, severe cases of which are often characterized by a yellowing of the upper, and reddening of the under side of the leaf.

Sharvelle (E. G.). **The use of dinitro-ortho-cresol as an eradicant spray for fruit diseases.**—*Plant Dis. Reptr*, xxvi, 6, pp. 153–157, 1942. [Mimeographed.]

On 30th April, 1940, some rows of McIntosh apples in an orchard in Minnesota were treated against scab [*Venturia inaequalis*] by means of a thorough ground spray of 0·5 per cent. elgetol [*R.A.M.*, xxi, pp. 82, 130, 245]. The whole orchard was later given five applications (between 9th May and 9th August) of lime-sulphur. In 1941, the same ground area was again sprayed with elgetol and the entire orchard given five summer applications of Stauffer magnetic '70' sulphur paste. Also in 1941, part of a block of Cortland apples, which had not previously been sprayed, was treated with 0·5 per cent. elgetol, the whole block then receiving the five summer applications of Stauffer magnetic '70' sulphur paste.

The results obtained were as follows. In 1940, the McIntosh apples given both elgetol and lime-sulphur showed 4·1 per cent. scab, with average disease rating per fruit (determined on an arbitrary basis, according to the number of lesions) of 1·21, as against corresponding figures of 20·5 and 2·44 for the lime-sulphur treatment alone. In 1941, the McIntosh apples given elgetol and sulphur paste showed 4·1 per cent. scab, with average disease rating of 1·9, as against corresponding figures of 6 and 1·8 for the sulphur paste alone. The Cortland apples given elgetol and sulphur paste showed 27·6 per cent. scab, with average disease rating of 1·51, as against corresponding figures of 56·6 and 1·85 for the sulphur paste alone.

In 1941, 0·75 per cent. elgetol, applied as a delayed dormant spray to raspberries against *Elsinoe veneta*, was observed to be equally effective with 3–50 lime-sulphur, and its use is being considered by certain growers on grounds of economy.

Zagallo (A. C.). **Influência da temperatura no desenvolvimento e frutificação do Coryneum longistipitatum Berl. et Bres.** [The influence of temperature on the development and fructification of *Coryneum longistipitatum* Berl. & Bres.]—*Agron. lusit.*, iii, 2, pp. 121–127, 2 pl., 2 graphs, 1941. [German summary.]

The principal results of the author's laboratory studies on the influence of tem-

perature on the germination and development of *Coryneum longistipitatum*, a pathogen of stored apples in Portugal, have already been noticed from another source [*R.A.M.*, xxi, p. 243]. At the optimum temperature for conidial production of 12° C., the spores develop in dark chestnut-brown to black masses, whereas at 20° to 22° they are sparse and irregularly distributed, tending to collect in the centre of the colony. At 24° to 27°, cultures remaining sterile in darkness or subdued light may be stimulated to sporulation by the action of sunlight. The colour of the mycelium gradually changes from white with a chestnut tinge between 7° and 15° to pale pink at 27°, nearing the maximum for its development.

Osterwalder (A.). **Von der Fettfleckenkrankheit der Kirschen.** [On the Cherry grease spot disease.]—*Schweiz. Z. Obst- u. Weinb.*, li, 15, pp. 309–311, 9 figs., 1942.

Lauerzer or Rigi cherries in the canton of Schwyz [Lake of Lucerne] have been observed since 1936 to suffer from an olive-green grease spot disease resembling that produced on beans [*Phaseolus vulgaris*] in the same district by a bacterium [*Pseudomonas medicaginis* var. *phaseolicola*], though it is improbable that the same organism is implicated in both cases. Bacteria of some description, however, swarm in the diseased tissues and were experimentally shown to be responsible for the cherry trouble, which in its final stages of blackening and desiccation resembles, and is liable to confusion with, the shot-hole disease [*Clasterosporium carpophilum*]. The pathogen apparently penetrates through the scar left by the style on the site of its insertion on the ovary, where the single lesion normally found on each fruit most commonly develops, though lateral infections may also take place through insect wounds. Control by direct measures appears to offer little prospect of success, since the grease spot is prevalent on 'blue'- and lime-sulphur-sprayed trees.

Hildebrand (E. M.). **Tomato ringspot on Currant.** —*Amer. J. Bot.*, xxix, 5, pp. 362–366, 4 figs., 1942.

Symptoms, hitherto undescribed on currants, were observed in 1940 on plants grown at 70° to 80° F. in the greenhouse at the Rockefeller Institute, Princeton, New Jersey, and identified as caused by the virus of tomato ring spot [*R.A.M.*, xix, p. 668]. The virus isolated from these plants was transmitted by the rubbing method (with or without carborundum powder) to Turkish tobacco and *Nicotiana rustica*, which both showed abundant lesions, and in a limited way to *N. glutinosa* and China aster. Attempts to transmit the virus from tobacco back to currant by mechanical means were unsuccessful, whereas sap transmission from tobacco to tobacco and from the various susceptible hosts back to tobacco was readily achieved by the rubbing technique, the symptoms produced on Turkish tobacco being similar to those of tomato ring spot; similar to, but distinct from, those of tobacco ring spot; and distinct from those of tomato ring spot described by Imle and Samson [ibid., xvi, p. 501]. Young plants were found generally more susceptible than older ones. The host range of the virus agreed closely with that of tomato ring spot, 29 species belonging to 20 families picked at random from the list of its hosts (given by Price [ibid., xix, p. 668]) being found susceptible. Inoculation with the virus from currant produced typical symptoms in plants immunized against tobacco ring spot, but not in those immunized against the tomato ring spot virus, indicating a near relationship to the latter. A close agreement was also found to exist between the two viruses as regards incubation period, thermal inactivation, longevity *in vitro*, filterability, and dilution end point, but the virus from currant appeared to be the more virulent of the two. It is concluded that the currant virus is a strain of tomato ring spot virus. The fact that the virus isolated from mosaic diseased currant plants induced tomato ring spot symptoms in some cases, but not in others, is taken to indicate that two distinct diseases are involved, which may sometimes occur together.

Waldo (G. F.). **The Brightmore Strawberry.**—*Circ. Ore. agric. Exp. Sta.*, 263, 3 pp., 1942. [Mimeographed.]

The Brightmore strawberry variety, which is being widely grown in the Pacific Northwest, and is recommended for trial particularly in those areas where the Marshall variety cannot profitably be grown, has so far shown no sign of susceptibility to crinkle or yellows [xanthosis: *R.A.M.*, xxi, p. 340]; it is, however, susceptible to red stele (*Phytophthora fragariae*) [loc. cit.].

Wilcox (R. B.). **Blueberry stunt, a virus disease.**—*Plant Dis. Reptr*, xxvi, 9, pp. 221–213, 1942. [Mimeographed.]

Swamp or high-bush blueberries (*Vaccinium australe* Small) in New Jersey have for some years been affected by a disease known locally as 'stunt', apparently of virus origin. The general effect is a reduction in the length and vigour of new growth, a moderate stimulation of branching, and the production of small, unmarketable fruit. When affected bushes are severely pruned back they form numerous weak shoots which by midsummer tend to show cessation of terminal growth and develop branches near the tip at sharp angles with the stem. On newly infected vigorous bushes the new shoots may be 3 ft. high, but in advanced stages they are not more than half this, and sometimes grow only a few inches. Individual shoots on diseased bushes may die during their first winter, but the bush itself may survive for some years. From two to five of the youngest leaves of an infected basal shoot are usually pale green or yellowish at the tip and on the margins, especially in the distal half. Less frequently, the young leaves appear almost completely etiolated. No foliage mottling is present. All the leaves are reduced in size, and the internodes are shortened.

On mature, fruiting canes few large branches are produced, but there are usually many fruiting laterals, which are short and slender and bear crowded leaves. Fruit buds are formed except in the most advanced cases, but the berries, while they colour normally, remain very small, have an unpleasant taste, do not readily separate from the stems, and may remain on the bush after the leaves have fallen in autumn. The foliage of mature canes on stunted bushes of most varieties by midsummer assumes a brilliant orange-red hue which persists until the leaves drop. This coloration develops in two longitudinal, indefinitely limited stripes at or just inside the margin, the central portion of the leaf, including the base and, usually, the tip, remaining green. In advanced infections, the leaf margins may become necrotic and brown, with the two parallel red stripes closer to the midrib.

The disease has not been observed on the Rancocas variety; it occurs most commonly on Cabot, Concord, Pioneer, Rubel (which does not show the red discoloration), and Scammell. It was first noted in New Jersey and has since been recorded from North Carolina and New York State. Nursery stock has not shown the disease so far, and the youngest field to show severe infection was eight years old.

The method of dissemination in the field is not yet known, but it is suspected that some insect not commonly present may be the vector. Affected bushes should be pulled up, and plants from affected fields should not be used for propagation.

Cabral (R. V. de G.). **Notas sôbre o Gloeosporium olivarum Alm.** [Notes on *Gloeosporium olivarum* Alm.]—*Agron. lusit.*, iii, 1, pp. 49–58, 2 pl., 2 graphs, 1941. [English summary.]

The destructive olive disease caused by *Gloeosporium olivarum* is widespread in Portugal [*R.A.M.*, xxi, p. 243], some varieties showing up to nearly 100 per cent. infection. The fungus affects only mature fruits, which become covered with the minute orange to brown acervuli of the fungus, later wrinkling and dropping. The attacks develop severely after the first rains in October or November. Pure cultures of the pathogen were readily obtained on Dox's agar from material gathered five months earlier and maintained at room temperature in the laboratory. Inoculations

by spraying and by pricking on the fruits of both cultivated and wild olive trees were uniformly successful, but only negative results were obtained on other parts. The incubation period was shorter on mature olive fruits than on those less ripe. The optimum temperature for growth of the fungus was found to be 26° C., but spore production was abundant at 22°, 24°, 26°, and 27°.

Shaw (E. B.). **Banana migration and sigatoka.**—*J. Geogr., N.Y.*, xl, 9, pp. 350–354, 1941. [Abs. in *Biol. Abstr.*, xvi, 6, p. 1453, 1942.]

There has been a progressive migration of banana production from east to west in Central America, partly owing to the presence of sigatoka disease (*Cercospora musae*) [*R.A.M.*, xix, p. 551; xx, pp. 125, 265] in the eastern parts, and partly owing to the fact that the western parts are drier, healthier, favourably situated for irrigation, and less subject to hurricanes than the eastern ones. The expense of piping for spraying against the disease is about the same as the initial per acre expense and is too heavy for many small independent owners.

Rhoads (A. S.). **Notes on Clitocybe root rot of Bananas and other plants in Florida.**—*Phytopathology*, xxxii, 6, pp. 487–496, 3 figs., 1942.

Attention has already been drawn to the ravages of the mushroom or toadstool root rot of bananas [*R.A.M.*, xi, p. 382] and other plants [ibid., xx, p. 562] in Florida caused by *Clitocybe tabescens*, the symptoms of which on the first-named host agree closely with those of the corm rot reported from New South Wales [ibid., xv, p. 238]. Other hosts of the fungus in Florida, besides grapefruit and peach [ibid., x, p. 99; xx, p. 562], include apple, plum, guava, Mexican guava (*Psidium molle*), Java plum (*Eugenia jambolana*), rose apple (*E. jambos*), cherimoya (*Annona cherimola*), soursop (*A. muricata*), *Litchi chinensis*, sapodilla (*Achras sapota*), *Jatropha curcas*, *Cecropia palmata*, Catalonian jasmine (*Jasminum grandiflorum*), Carolina laurel-cherry (*Laurocerasus caroliniana*), *Dombeya punctata*, Woodland Margaret rose, and *Hibiscus rosa-sinensis*.

Hadorn (C.). **Rationierung der Kupferspritzmittel in der Landwirtschaft.** [Rationing of copper spraying materials in agriculture.]—*Schweiz. Z. Obst- u. Weinb.*, li, 8, pp. 178–180, 1942.

Copper compounds in the form of fungicidal solutions are estimated to have saved Switzerland enormous losses from plant diseases during the past several decades, preventing, for instance, crop reductions of 30 to 50 per cent. from potato and tomato blight [*Phytophthora infestans*] and of 50 to 60 per cent. from celery leaf spot [*Septoria apii*]. In the absence of prophylactic treatment, moreover, anthracnose [*Colletotrichum lindemuthianum*] and rust [*Uromyces appendiculatus*] decimate the bean [*Phaseolus vulgaris*] crop, while vine downy mildew [*Plasmopara viticola*] is so prevalent that the grape harvest would be a total failure without spraying. The normal Swiss copper requirements for spraying in 1942 would have amounted to 1,550 tons of metal, but the war situation has necessitated the reduction of this quantity to 690 tons, of which 300 tons are allocated for the potato crop; 12·5 tons for beans, tomatoes, celery, and onions; a maximum of 50 tons for orchards; 320 tons for viticulture [cf. ibid., xxi, p. 439]; and finally, a reserve of 25 tons in case of emergency.

Parker-Rhodes (A. F.). **The fungicidal action of copper and sulphur.**—*Rep. Agric. Hort. Res. Sta., Bristol, 1941*, pp. 83–85, [1942].

This is an abbreviated account of the author's researches already noticed from other sources [*R.A.M.*, xxi, pp. 150, 422].

Goldsworthy (M. C.), Carter (R. H.), & Green (E. L.). **The fungicidal and phytocidal properties of some copper xanthates.**—*Phytopathology*, 6, pp. 497–504, 1942.

Saturated solutions of copper xanthates contain very little available copper, and

this element appears to be so tightly combined with sulphur that the compounds are non-injurious to sprayed plants. In laboratory perfusion tests [*R.A.M.*, xvii, p. 541] all of five copper xanthates were more or less toxic to the conidia of *Sclerotinia fructicola*, the most effective being those prepared from ethyl and butyl alcohols, whereas the spores of *Glomerella cingulata* proved resistant to their action, which in the case of both pathogens was of the same order as that exerted by a solution containing 0·50 p.p.m. of copper. Spray residues containing the ethyl and isoamyl xanthates were toxic to the conidia of *S. fructicola*, but not those of *G. cingulata*. Data from further tests indicated that the residues from copper xanthate mixtures are not as potent as those of Bordeaux mixture.

In orchard experiments at the United States Horticultural Station, Beltsville, Maryland, on five-year-old Williams' Early Red, York Imperial, Rome Beauty, and Starking Delicious apple trees infected with scab (*Venturia inaequalis*), the protection conferred by the copper ethyl and isoamyl xanthates (2 lb. of either to 4 of hydrated lime, 2 of bentonite, and 100 gals. water) was not equal to that afforded by the standard schedule of early lime-sulphur and late copper phosphate sprays, though they did reduce the incidence of infection to a very considerable extent, especially in York Imperial.

Under greenhouse conditions the xanthates caused no injury to Red Kidney beans (*Phaseolus vulgaris*) and Starking Delicious apple foliage at high or low humidities and average temperature, but in the above-mentioned orchard trials on apples in 1937, the copper ethyl and isoamyl xanthates appeared to favour the development of arsenical injury when lead arsenate was included in the spray combination.

PARTANSKY (A. M.). **Field testing of mold resistant properties of interior oil paints.**—*Industr. Engng Chem.*, Analyt. Ed., xiv, 7, pp. 527–531, 6 figs., 1942.

The results of field tests on the mould-resistant properties of interior oil paints at various industrial plants in the mid-western and eastern States of the American Union confirmed those of previous laboratory experiments [*R.A.M.*, xix, p. 719] as to the preservative efficacy of tetrachlorophenol and zinc tetrachlorophenate, both of which, at a concentration of 3 per cent., maintained an oil and a cold-cut resin type of paint in a sound condition for two years.

LINN (M. B.). **A method of mounting cultures of fungi for preservation in the herbarium.**—*Phytopathology*, xxxii, 6, pp. 546–547, 1942.

Celluloid, washed, rinsed, dried, and cut into squares slightly larger than a Petri dish, has been found superior as a mounting base for fungal cultures to paper or other materials previously utilized for this purpose. The agar medium (2 per cent. potato dextrose in the author's tests) is lifted from the dish with a spatula, laid in the centre of the celluloid square, and left to dry for three days at 20° to 25° C., under which conditions it becomes firmly attached to its base.

BROOKS (F. T.). **Disease-resistant plants.**—*Endeavour*, i, 3, pp. 114–117, 3 figs., 1942.

The author traces the history of plant hybridization from the early pioneer work in the nineteenth century to modern breeding of plant varieties resistant to disease based on Mendel's law of heredity. Special mention is made of attempts to breed disease-resistant varieties of wheat, potato, tomato, fruit trees, and of tropical crops such as sugar-cane, banana, and cacao.

PINCKARD (J. A.). **The mechanism of spore dispersal in Peronospora tabacina and certain other downy mildew fungi.**—*Phytopathology*, xxxii, 6, pp. 505–511, 2 figs., 1942.

In studies at the Virginia Agricultural Experiment Station, sporangial dispersal in the agent of tobacco downy mildew, *Peronospora tabacina* [*R.A.M.*, xix, p. 439],

P. parasitica on *Lepidium virginicum*, *P. geranii* on *Geranium carolinianum*, and *P.* [*Plasmopara*] *halstedi* on *Ambrosia* spp. was observed to begin with incipient desiccation and conclude with hygroscopic distortion of the aerial fructifications. Several complete twists occur in the portion of tall sporangiophores extending up to the first branch, with a lesser number between each successively shorter branch. With the progress of drying, a twisting and bending motion is imparted to the sterigma-like structure on which the sporangia are borne. On the discontinuance of desiccation the movement ceases, and with an access of humidity the rotation reverses itself. Under conditions of delicate moisture balance the breath of the observer suffices to induce the above-mentioned movements, the outcome of which is the release of the mature sporangia. The ejection of mature sporangia was experimentally shown not to be dependent upon entanglement. By slowly decreasing the vapour pressure a point was reached when abcission occurred, the sporangium apparently being forcibly released, the stimulus for the requisite energy being derived from differential stresses set up within the sterigmata. C. J. Nusbaum *in litt.* describes a similar hygroscopic mechanism in *Peronospora parasitica* on cabbage and *P. effusa* on *Chenopodium album*. The mechanical action of wind and rain, during periods of atmospheric saturation, does not appear to contribute significantly to sporangial dispersal in the downy mildews under observation.

Hofmeyr (J. H.). **Inspection of Potato fields for seed Potatoes.**—*Fmg S.Afr.*, xvii, 196, pp. 439–440, 1942.

Details are given of the potato inspection scheme which has been functioning for about a year in South Africa. The inspection, which covers virus and other diseases and eelworm infestation, is being extended to individual farmers outside seed potato-growers' associations.

Folsom (D.). **Potato virus disease studies with tuber-line seed plots and insects in Maine 1927 to 1938.**—*Bull. Me agric. Exp. Sta.* 410, pp. 215–250, 4 pl., 1 map, 1942.

In field work conducted from 1927 to 1932 at Highmoor Farm, south-western Maine, 21 tuber-line seed plots were invaded in 15 out of 75 exposures by one or another of the virus diseases present on potatoes in fields situated not less than ¼ mile away (e.g., mild and rugose mosaic, leaf roll, spindle tuber, and yellow top [*R.A.M.*, xxi, p. 322]). The results of regular inspections of 114 tuber-line seed plots grown from 1933 to 1938 on 74 different farms (mostly with seed from Highmoor Farm seed plots, planted under an aster-cloth cage which excludes virus diseases perfectly) showed that mosaic (mostly mild) invaded 43 plots out of 83, leaf roll 17 out of 39, yellow top 3 out of 108, and spindle tuber 1 out of 109. The average proximity to diseased fields was much greater for the plots invaded by mosaic and leaf roll than for those not invaded, but the amount of disease in the invaded plots was not indicated reliably by the degree of proximity. The farmers' seed plots were invaded by mosaic and leaf roll in varying degree according to seasonal and other factors. Thus, in 1937, the incidence of leaf roll was unusually high in all counties, while that of mosaic increased in some and decreased in others. Both diseases usually increased in spite of roguing or appeared where they were absent before, while spindle tuber decreased when present and yellow top mostly disappeared altogether. It was found that the further north and east in the State the seed plot was planted, the more likely would be an increase in mosaic and the less likely one in leaf roll. Mosaic increase was correlated significantly with that of leaf roll in two years, but not in the other three. The certification proximity rule was found not a safe guide as to the amount of disease invading healthy plots. Insect counts and root contact tests showed that leaf roll was transmitted by two aphids, *Macrosiphum solanifolii* and

Aphis abbreviata, but not by *Epitrix cucumeris*, *Leptinotarsa decemlineata*, *Empoasca mali*, or *Lygus pratensis*, and not by root contact in the soil.

Söding (H.). **Über den Wuchsstoffhaushalt abbaukranker Kartoffeln.** [On the auxin economy of 'degenerate' Potatoes.]—*Angew. Bot.*, xxiv, 1–2, pp. 114–117, 1942.

In further studies on the relationship of the auxin content of potatoes to 'degeneration' [*R.A.M.*, xix, p. 298], diseased plants were found not only to be poorer in growth substances than healthy ones, but also to respond much less actively to the application of heteroauxin solutions to the leaf rachis. The deep-seated changes in the growth system of the plant thus expressed probably represent a 'vicious circle', in which a reduction of the auxin content brings about a loss of plasticity, the latter entailing weakness of reaction to the stimulus of growth substances and the whole series of pathological modifications culminating in under-development and probably in a lowered capacity for auxin formation. By means of Funke's highly sensitive 'coleoptile test' (*Jb. wiss. Bot.*, lxxxviii, p. 373, 1939) it was possible to determine the effect on the auxin content of the tubers of different viruses, of which leaf roll was markedly instrumental in destroying the growth substances, though the action of various types of mosaic and of the X and A viruses could also be traced. Observations (as yet unpublished) point to the simultaneous existence in the potato tuber of auxins and substances inhibiting their functions.

Stapp (C.). **Serologischer Nachweis von X-, Y- und A-Virus der Kartoffeln. Vorläufige Mitteilung.** [The serological diagnosis of the X-, Y-, and A-viruses of Potatoes. Preliminary note.]—*Zbl. Bakt.*, Abt. 2, cv, 7–9, pp. 127–128, 1942.

By means of intravenous injections into rabbits of potato juices infected by the X, Y, and A viruses, the writer, using first the precipitin-ring method for X, Chester's field technique [*R.A.M.*, xxi, p. 425] for Y, later Pfankuch and Kausche's method [ibid., xvii, p. 764] for X, and an as yet unpublished modification of the same for Y and A, secured antisera reacting specifically towards these viruses, both singly and in combination.

Köhler (E.). **Untersuchungen über das 'K'-Virus der Kartoffel. 1. Mittlg.** [Studies on the 'K' virus of the Potato. Note 1.]—*Angew. Bot.*, xxiv, 1–2, pp. 118–130, 3 figs., 1942.

The salient features of the aphid- and graft-transmissible 'K' virus of potatoes, isolated by the writer in 1940 from samples of diverse origin planted at the Biological Institute, Dahlem, Berlin, in the previous autumn, have already been described from another source [*R.A.M.*, xx, p. 486]. In the present expanded and tabulated account the opinion is expressed that the newly identified virus is in all probability identical with Dykstra's 'E' (leaf-rolling mosaic) [ibid., xix, p. 337], though the available data do not at the moment suffice for the complete establishment of this hypothesis.

Kreutzer (W. A.) & McLean (J. G.). **First report of late blight of Potato in Colorado.** —*Plant Dis. Reptr*, xxvi, 4, p. 91, 1942. [Mimeographed.]

During 1941 *Phytophthora infestans* was found on potatoes in the irrigated section of northern Colorado, this being, apparently, the first record for the State. Infection was first observed in storage. Of 20 cellars where infected lots were found, most showed a trace to 0·5 per cent. of the disease; one seed lot contained 1 per cent. infected material, and two showed nearly 25 per cent., the tubers in the last two cases being grown from seed obtained from the Lake States region. Weather conditions during the growing season in Colorado do not, as a rule, favour *P. infestans*, but in 1941 rainfall was above normal, and many cloudy or partially cloudy days were experienced, frequently accompanied by light rainfall and lowered temperatures. Precautions are being taken against the use of infected seed.

Müller (K. O.) & Griesinger (R.). **Der Einfluss der Temperatur auf die Reaktion von anfälligen und resistenten Kartoffelsorten gegenüber Phytophthora infestans.** [The influence of temperature on the reaction of susceptible and resistant Potato varieties to *Phytophthora infestans*.]—*Angew. Bot.*, xxiv, 1–2, pp. 130-149, 5 graphs, 1942.

In further studies on the physiological and genetical bases of resistance in the potato to late blight (*Phytophthora infestans*) [*R.A.M.*, xxi, p. 217], the minimum, optimum, and maximum temperatures for the development of the fungus on the tubers were found to be just under 5°, 19° to 20°, and 25° to 26° C., respectively. In the resistant varieties BRA 5/31 and BRA 9/31, the defensive reaction sets in between 5° and 11°, the speed of the process increasing as the temperature rises; another slight access of velocity occurs within the range of 21° to 25°. Defensive necrosis is intensified at low temperatures. A defensive reaction also takes place in the susceptible Erdgold, but its progress is too slow, in comparison with the rapidity of development of the pathogen, to bring the latter to a standstill and premature death. In the various temperature ranges mycelial production on Erdgold tubers increased in luxuriance with the time interval between the appearance of the first aerial hyphae and the preliminary indications of necrotic changes. It is concluded from the data at hand that the extent of mycelial growth is a result of the interaction of two factors—vitality of the fungus on the one hand, and rapidity of response of the tuber to infection on the other. The sporangia of *P. infestans*, introduced into the tuber through wounds, retain their infectivity for at least a month. Resistance tests on tubers are best conducted at a temperature range of 16·5° to 21°.

Szirmai (J.). **Ein sonderbarer Fall des Auftretens von Rhizoctonia solani auf der Kartoffel in Mieten.** [A remarkable case of the occurrence of *Rhizoctonia solani* on the Potato in pits.]—*Mezőgazdas. kutatás.*, xiv, pp. 291–295, 1941. [Hungarian, with German summary. Abs. in *Chem. Zbl.*, cxiii (ii), 2, p. 229, 1942.]

Potato tubers stored in sand for the winter were found on examination at the Agricultural Research Institute, Nagybakta, Hungary, to be infected by *Rhizoctonia* [*Corticium*] *solani*, which had entered by way of the lenticels, penetrating the tissues to a depth of 1 cm. and causing up to 100 per cent. damage. It was found that the sand in the affected pits had not been renewed for four years, and its replacement by a fresh load resulted in a reduction of the injury to between 2 and 4 per cent.

Boewe (G. H.). **Charcoal rot on Potatoes in Illinois.**—*Plant Dis. Reptr*, xxvi, 6, pp. 142–143, 1942. [Mimeographed.]

On 1st July, 1941, potato plants near East St. Louis, Illinois, were found to be affected by *Rhizoctonia bataticola* [*Macrophomina phaseoli*], this being the first record of the fungus on potato in the State [*R.A.M.*, vii, p. 53; xix, p. 254]. All the potato fields visited in this locality (Madison and Monroe counties) contained affected plants; the disease was also present in La Salle county. In affected fields in which counts were made diseased hills averaged 19·7 per cent. The sclerotia ranged from 49·8 to 106·2 by 43 to 83 (average of 100, 77·4 by 66·1) μ.

List (G. M.) & Kreutzer (W. A.). **Transmission of the causal agent of the ring-rot disease of Potatoes by insects.**—*J. econ. Ent.*, xxxv, 3, pp. 455–456, 1942.

Provisionally accepting as evidence of transmission the migration of the ring rot organism (*Phytomonas sepedonica*) [*Corynebacterium sepedonicum*] from the point of feeding on the foliage of caged potato plants raised from disease-free seed, the writers, in a preliminary test at the Colorado Agricultural Experiment Station, implicated the potato beetle (*Leptinotarsa decemlineata* Say), grasshoppers (*Melanoplus differentialis* Thomas), and the black blister beetle (*Epicauta pennsylvanica* De Geer) as

vectors of the disease, though not necessarily constituting an important factor in field spread.

Goss (R. W.), Leach (J. G.), & Dykstra (T. P.). **Committee report on ring rot of Potatoes in 1941.**—*Plant Dis. Reptr*, xxvi, 8, pp. 197–198, 1942. [Mimeographed.]

In this report of the Committee appointed by the American Potato Association to stimulate and co-ordinate research into potato ring rot (*Phytomonas sepedonica*) [*Corynebacterium sepedonicum*: *R.A.M.*, xxi, pp. 301, 322], it is stated that a survey made in the United States during 1941 showed that in 17 States the disease was less prevalent than in 1940, while in eight it was more widespread. In one State 33 per cent. of the carload lots dispatched in 1940 contained infected potatoes, whereas in 1941 only 6 per cent. were affected. In another State the losses in the two years before 1941 in one county alone amounted to $200,000, whereas in 1941, with greater care in handling the seed, the loss did not exceed $10,000. Most States attributed the decreased infection of 1941 to the publicity given to control, and to the cheapness of certified seed. The outlook is good, provided the certifying agencies in the seed-producing States keep up close control.

It is recommended that, in addition to field inspection, at least four 25 lb. random samples for each 1,000 bush. stored should be examined (by the inspector) by cutting every tuber. Suspected tubers should be examined under fluorescent light, or smears should be made and examined under a microscope. The bin inspection should be conducted as late in winter as possible.

Cralley (E. M.) & Adair (C. R.). **Rice blast in Arkansas.**—*Plant Dis. Reptr*, xxvi, 6, pp. 149–150, 1942. [Mimeographed.]

Rice blast (*Piricularia oryzae*) [*R.A.M.*, xxi, pp. 96, 160] has caused serious losses in those parts of Arkansas that have recently been brought into rice production. The disease decreases in importance as the land is cropped to rice, and seldom causes severe damage after three or four crops have been grown. Minor losses have occurred in old rice fields previously out of rice production for some years. The tabulated results of resistance tests on 29 varieties or hybrids in 1940 and 1941 showed that Early Prolific, a variety commonly grown on new land, is very susceptible, while Zenith and Arkansas Fortuna, which generally outyield Early Prolific and command better prices, are resistant. The high-yielding hybrid selections, Arkrose and Prelude, appear to be moderately resistant.

Bottcher (Elizabeth J.) & Conn (H. J.). **A medium for the rapid cultivation of soil Actinomycetes.**—*J. Bact.*, xliv, 1, p. 136, 1942.

At the New York (Geneva) Agricultural Experiment Station the authors have obtained rapid growth of eleven cultures of soil Actinomycetes on a medium consisting of cotton soaked in 5 ml. glycerol, 2 gm. yeast extract, 1 gm. potassium nitrate, and 1,000 ml. water.

Pozdena (L.) & Bartram (H.). **Komplexbedingte Bodenkrankheiten.** [Soil diseases of complex origin.]—*Bodenk. PflErnähr.*, xvii, pp. 33–35, 1940. [Abs. in *Zbl. Bakt.*, Abt. 2, ciii, 18–20, p. 366, 1940.]

The examination of soil profiles in the Warthe and Oder marshes to ascertain the reason for the failure of liberally manured crops pointed to physical causes as the chief etiological factor, to which the observed biological abnormalities are subsidiary. The latter were characterized by an erratic instead of a steady decrease in the microflora of the deeper soil layers, and by a preponderance of Actinomycetes at nearly every depth investigated, especially in iron-containing soils. Pure-culture studies showed that development and sporulation in this group of fungi is markedly stimulated by

iron, the presence of which may even counteract other conditions adverse to their growth, such as deficiency of organic materials.

KERR (W. H.). **Bureau of Sugar Experiment Stations.**—*Aust. Sug. J.*, xxxiv, 4, pp. 153–155, 1942.

The following restrictions are imposed by Proclamation No. 13, issued under the Sugar Experiment Stations Acts, on the whole of the Moreton Mill (Queensland) area. 1. No sugar-cane of any variety may be removed from any farm which has been infected with Fiji disease [*R.A.M.*, xxi, p. 305] during the past three years, or from one part of any such farm to another, without a written permit from the Moreton Cane Pest and Disease Control Board for such transfer. This does not apply to cane sent to the mill for crushing, but precludes the use by a grower of plants from a diseased farm. 2. On any farm on which Fiji disease is, or has been present within the last three years, no cane of the P.O.J. 2878 variety may be further ratooned if planted in or before 1939. An owner of a Fiji-diseased farm, wishing to carry on to 1943 any cane of this variety dating from or before 1939 must apply for a permit to do so. 3. The Moreton Central Sugar Mill is prohibited under penalty from crushing P.O.J. 2878 from diseased farms for which no permit has been granted for cultivation beyond the fourth calendar year of growth.

The spread of Fiji disease during the late summer and autumn of 1941 was well above normal, owing to favourable conditions for the activity of the sugar-cane leafhopper [*Perkinsiella saccharicida*], especially in parts of the Bundaberg and Moreton areas, but the repeated inspections conducted by the Cane Pest and Disease Control Boards [ibid., xxi, p. 44], combined with the dry conditions prevailing early in the current year, are expected to restore the situation before next season. In the Maryborough district a striking improvement has been effected by the non-approval of susceptible varieties in severely infested areas.

Downy mildew [*Sclerospora sacchari*: ibid., xxi, pp. 304, 347] has been kept well under control at Bundaberg, but continuous vigilance is essential since the disease is of a type liable to 'flare up' without warning. Infection would by now have been practically eliminated from Mackay but for the ill-advised retention by certain growers of small patches of non-approved, susceptible varieties, thereby postponing the time for the safe reintroduction of P.O.J. The position is well in hand in the Cairns and Mossman districts, where small outbreaks of downy mildew have been cleaned up.

BENNETT (C. W.). **Informe sobre experimentos con el mosaico de la Caña de Azúcar en Tucumán, Argentina. Octubre 12 de 1940 a febrero 9 de 1941.** [Report on experiments with Sugar-Cane mosaic in Tucumán, Argentine, from 12th October, 1940, to 9th February, 1941.]—*Rev. industr. agríc. Tucumán*, xxxi, 10–12, pp. 427–437, 1941.

A detailed, tabulated account is given of a series of nine inoculation experiments (by sap transmission) on four sugar-cane varieties C[anal] P[oint] 28/60, C.P. 31/294, C.P. 31/588, and C.P. 29/291, with the mosaic virus from P.O.J. 213, 2727, and 36 (including strains of the last-named from the provinces of Tucumán and Jujuy), Bourbon, Louisiana Striped, Tuc. 472, and a Portuguese East African selection designated Co. 4x, from the results of which it would appear that the symptoms induced by the inoculation from all sources corresponded in the main to those of the United States type 2 [*R.A.M.*, xviii, pp. 621, 622]. They included stunting, mottling, marginal and apical necrosis in C.P. 28/60 and 31/294, chlorotic foliar lesions attaining a diameter of up to several centimetres, with localized reddening of their centres and edges, and limited superficial necrosis in 31/588, and very mild, generalized mottling in 29/291. Out of 25 plants of C.P. 28/60 inoculated 15 contracted infection, the

corresponding figures for 31/294, 31/588, and 29/291 being 15 out of 33, 13 out of 33, and 10 out of 19, respectively.

Seaver (F. J.). **Photographs and descriptions of cup-fungi. XXXVI. A new species and genus.**—*Mycologia*, xxxiv, 3, pp. 298–301, 1 fig., 1942.

After referring to the fact that Dr. L. Bonar of California has proved by cultures that the ascospores of *Dermatea brunneo-pruinosa*, described by Zeller (*Mycologia*, xxvi, p. 291, 1934) on leaves of *Gaultheria shallon* on spots associated with *Pestalotia gibbosa* do in fact on germination produce the conidial or *Pestalotia* stage, the author states that in 1938 he received *Rhododendron maximum* leaves showing spots bearing a *Pestalotia* stage and an apothecial stage so similar to that described by Zeller that they were at first considered to be identical. The connexion between the *Pestalotia* and the associated Ascomycete on rhododendron is assumed to exist; as the conidial stages of the two fungi appear to be distinct, the perfect stages are, for the present, also assumed to be distinct.

The name *Pestalopezia* n. gen. is proposed for those species of cup fungi which have a *Pestalotia* as their conidial stage; type species, *Dermatea brunneo-pruinosa*, which would become *Pestalopezia brunneo-pruinosa* (Zeller) Seaver, comb. nov. The rhododendron fungus is named *Pestalopezia rhododendri* n. sp.

Murrill (W. A.). **New fungi from Florida.**—*Lloydia*, v, 2, pp. 136–157, 1942.

Latin and English diagnoses are given of 52 new species and one new variety of fungi from Florida, the new variety being *Rigidoporus surinamensis subauberianus*, found on the base of a living laurel oak [*Quercus laurifolia*] and apparently intermediate between *R. surinamensis* and *Fomes auberianus*. It is characterized by a sessile, subdimidiate, imbricate, cremeous to badious pileus measuring about 6 by 9 by 1 cm., and globose spores 3 to 4 μ in diameter.

Da Camara (E. de S.) & Da Luz (C. G.). **Mycetes aliquot Lusitaniae IV.** [Some fungi of Portugal IV.]—*Agron. lusit.*, iii, 1, pp. 25–46, 8 figs., 1941.

This further instalment of the authors' critically annotated list of Portuguese fungi [*R.A.M.*, xix, p. 365] brings the total number so far recorded to 234, two species, two varieties, and one form in the present series being new to science and 36 additions to the mycoflora of the country. *Pleosphaerulina briosiana* n. var. *macrospora* was collected on the leaves of crimson clover (*Trifolium incarnatum*), *Sphaeropsis malorum* [*Physalospora obtusa*] on pear fruits, and *Gloeosporium mangiferae* [*Glomerella cingulata*] on mango fruits (in the Lisbon market).

Da Camara (E. de S.), D'Oliveira (A. L. B.), & Da Luz (C. G.). **Uredales aliquot Lusitaniae I (continuatio). II.** [Some rusts of Portugal I (continuation). II.]—*Agron. lusit.*, ii, 2, pp. 113–167; 4, pp. 338–377, 1940.

These two further instalments of the authors' critically annotated catalogue of Portuguese rusts [*R.A.M.*, xx, p. 136] bring the total number of species on record for the country to 95. A six-page bibliography and a host index are appended to the second paper.

Mundkur (B. B.) & Kheswalla (K. F.). **Indian and Burman species of the genera Pestalotia and Monochaetia.**—*Mycologia*, xxxiv, 3, pp. 308–317, 1942.

This paper records the result of an investigation of the species of *Pestalotia* and *Monochaetia* collected by Sir Edwin Butler and his colleagues over a period of nearly 20 years in India and Burma. The investigation revealed that there are 31 species of the former genus and two of the latter in these countries. *Pestalotia citri* n. sp. is recorded as occurring on living leaves of *Citrus decumana*, Kirkee, 1914, *P. pipericola*

n. sp. on leaves of *Piper nigrum*, Malabar, 1909, and *P. lawsoniae* n. sp. on leaves of *Lawsonia alba*, Pusa, 1906.

Pinckard (J. A.) & Bozovaisky (L. S.). **Cold injury of flue-cured Tobacco seedlings.** —*Phytopathology*, xxxii, 6, pp. 512–517, 4 figs., 1942.

A disorder of tobacco seedlings prevalent in the 'bright' tobacco-growing areas of Virginia, where it is known as 'white' or 'yellow bud', is characterized by xanthosis of the young leaves enclosing the growing point, followed in severe cases by necrosis of the marginal cells and sometimes by temporary retardation of growth. Mature leaves damaged by cold exhibit irregular patterns and blanching. A similar condition was observed by Valleau and Johnson in Kentucky (*Plant Dis. Reptr*, xxiv, 12, pp. 236–238, 1940), where it was correctly diagnosed as due to cold injury, the same factor being operative in the present studies, in which the typical symptoms were induced by 2 to 3 hours' exposure to temperatures between 24° and 26° F. or 15 to 16 hours at 29° to 32°, thickening and glazing of the foliage being particularly marked at the former range; by the fifth day after treatment the abnormalities were obvious. In the field the trouble occurs when the warm days of early spring are interrupted by brief cold spells.

Clayton (E. E.), Gaines (J. G.), Shaw (K. J.), Smith (T. E.), Foster (H. H.), Lunn (W. M.), & Graham (T. W.). **Gas treatment for the control of blue mold disease of Tobacco.**—*Tech. Bull. U.S. Dep. Agric.* 799, 38 pp., 7 figs., 1942.

In controlled experiments using glass and wood enclosures approximately 1 yd. square, benzol treatment rising to a maximum concentration of 0·1 per cent. during the period 4.30 p.m. to 8 a.m. gave complete control of blue mould disease of tobacco (*Peronospora tabacina*) [*R.A.M.*, xx, p. 430], partial control resulting from even the lowest concentration used (maximum of 0·018 per cent.); moderate retardation of growth occurred only with much higher concentrations (maximum of 0·83 per cent.). Benzol concentrations (determined by means of the Mine Safety Appliance Co. instrument) in plant-beds in which disease control has been obtained reached maximum readings of 0·5 and 0·6 per cent., but in many beds they fell between 0·1 and 0·2 per cent. The results of many tests over several years showed that effective control can be obtained by applying benzol treatment twice a week at the rate of 5 qts. per 100 sq. yds. of bed, providing for an evaporating pan surface of one-hundredth of the bed area with the aid of cloth wicks and with pans 8 to 10 ft. apart, and a muslin cover, 60 to 65 thread count, weighing about 4½ oz. per sq. yd.

In tests with other vapours, xylol was found to be about 2½ times as effective as benzol, beta-trichloroethane 5 times, and pentachloroethane about 15 times as effective; however, it is understood that the supplies of xylol are limited, while pentachloroethane has the serious disadvantage that the treated plants wilt severely when exposed to bright sun.

Extensive studies on treatment with para-dichlorobenzene showed that the vaporization rate of this material depends on the size of crystals, type and size of surface over which the crystals are scattered, and temperature. The rate was found to increase as the size of crystals decreased from grade 1 (average diameter 11·93 mm.) to 9 (0·93 mm.); still smaller crystals tended to aggregate and were therefore unsatisfactory. Vaporization from an open surface of tobacco cloth or wire mesh was almost twice as rapid as from solid board surface. When the area over which the crystals were scattered was increased from $\frac{1}{18}$ of the bed area to $\frac{1}{9}$ (at the rate of 3 lb. per 100 sq. yds.) or to $\frac{1}{3}$ (4½ lb. per 100 sq. yds.), the rate of vaporization increased on the average from 40·2 to 69·9 and from 27·5 to 66·8 per cent., respectively. It was found that the effect of temperature on vaporization can to some extent be compensated by the size of crystals and the size of the area over which they were scattered. Thus, under very cool conditions the smallest crystals (grade 9) and the

widest distribution (over the entire bed) were most effective, whereas under warm conditions larger crystals and distribution on board shelves or in wire baskets were more satisfactory. Generally speaking, vaporization rates below 45 per cent. were ineffective, and above 93 per cent. likely to cause injury to the plants. Maximum vaporization usually occurred during the first one-third of the night. Using grade 9 crystals on warm nights almost all the para-dichlorobenzene may evaporate during this first period and cause severe plant injury. The best control was obtained with vaporization throughout the night (4.30 p.m. to 8 a.m.), and treatment during the first half of the night was more effective than during the second half. Daytime treatment was ineffective and frequently caused severe injury to the plants.

Practical recommendations, based on these studies, for the treatment with para-dichlorobenzene have already been noticed from another source [ibid., xx, p. 282].

Most growers are stated to consider any form of benzol treatment as too cumbersome, and to provide benzol at moderate cost tank-car distribution would be required. On the other hand, para-dichlorobenzene is readily available in small quantities and is more convenient to use, but because the margin of safety is less than with benzol, the limitations of the chemical, particularly with respect to vaporization, must be thoroughly appreciated.

Anderson (P. J.). **A successful spray for blue mold of Tobacco.**—*Plant Dis. Reptr*, xxvi, 8, pp. 201–202, 1942. [Mimeographed.]

Experiments on four crops of tobacco during the winter of 1941 in the greenhouse, and in the spring of 1942 in seed-beds demonstrated that spraying with ferric dimethyl dithiocarbamate [*R.A.M.*, xxi, p. 383] gave 95 to 100 per cent. control of *Peronospora tabacina* [ibid., xx, p. 429]. The best results were given by a solution of 1½ to 2 gm. of the material per l. of water, plus an equal amount of lime. Spraying was effected twice weekly. The substance in question is being introduced by Du Pont under the trade name 'fermate'.

Phillips (J. H. H.). **Three strains of Cucumber mosaic occurring on Tobacco in Ontario and Quebec.**—*Canad. J. Res.*, Sect. C, xx, 6, pp. 329–335, 1 pl., 1942.

Tobacco in Ontario and Quebec was found to be affected by three strains of cucumber mosaic virus. Strain 1 most closely resembled typical cucumber mosaic virus in its symptoms on tobacco and tomato. Strain 3 produced a similar kind of mottle, but was generally more severe, and consistently produced severe leaf-narrowing on tomato. Strain 2 was easily recognized by its ability to produce necrotic rings on the inoculated leaves of Burley tobacco varieties, and the tendency of affected plants to recover from the initial symptoms. All three strains retained their identity through many serial inoculations.

A severe type of streak resulted when tomato plants were inoculated with a combination of cucumber mosaic virus (strain 3) and potato X virus.

The cucumber mosaic virus was unable to overwinter in plant tissue in the soil.

Thomas (H. R.). **A defoliation of Tomatoes in Indiana controlled by spraying with manganese sulphate.**—*Plant Dis. Reptr*, xxvi, 8, pp. 198–199, 1942. [Mimeographed.]

In 1940 and 1941 tomatoes in various counties of Indiana became severely defoliated. The first symptoms of the condition were chlorosis and inward rolling of the leaflets, followed by necrotic spotting. The affected areas enlarged, coalesced, and finally caused the leaflets to wither and die. Severely affected plants showed only a tuft of leaves at the tips of the stems; affected plants were stunted, with a light green colour which enabled the diseased patches to be distinguished from the edge of the field.

In 1940 solutions of manganese sulphate, ferric sulphate, borax, and zinc sulphate were sprayed on to affected plants, while in some cases, instead of these treatments, sulphuric acid solution was added to the soil. Only the plants sprayed with manganese sulphate or growing in the acid-treated soil produced new growth without spotting. In one locality rapid recovery followed an early application in 1941 of manganese sulphate spray. It would appear that disturbance of the soil texture or environmental conditions affected manganese availability.

Miller (J. H.) & Grogan (R.). **Injury to Tomato seed in disinfection.**—*Phytopathology*, xxxii, 6, pp. 524–528, 2 graphs, 1942.

The effect on the germination of tomato seed of mercuric chloride (1 to 3,000) and new improved ceresan (1 to 1,200) was investigated at Athens, Georgia, by treating a constant weight of seed with increasing volumes of solution and increasing weights of seed with a constant volume of solution, and estimating germination after 4, 7, and 11 days. It was concluded that when the ratio of the seed weight to the volume of the treating solution is increased above 1 to 8 germination is progressively impaired. No significant difference was observed between the two solutions, each of which at a ratio of 1 to 8 gave complete disinfection without seriously affecting germination.

Mielke (J. L.) & Kimmey (J. W.). **Heat injury to the leaves of California Black Oak and some other broadleaves.**—*Plant Dis. Reptr*, xxvi, 5, pp. 116–119, 1 graph, 1942. [Mimeographed.]

Early in July, 1941, California black oak trees (*Quercus kelloggii*) growing over a wide area in northern California developed a reddish-brown discoloration of the leaves, which in one locality was so pronounced that it imparted a characteristic hue to entire mountain-sides. On the affected leaves (except for a few that became completely discoloured) the browning was confined mainly to a broad, irregularly shaped band round the margins. Many of the most severely affected leaves fell soon after the injury became apparent, but the greater part remained attached to the trees during most of the summer. A few trees lost nearly all their leaves in July, and most of these produced a small crop of new leaves in late July and early August, together with new woody growth. No causal organism appeared to be associated with the condition, which is attributed to injury to the young leaves brought about by a sudden rise in temperature between 5th and 12th July, when the thermometer rose to 105° F.; the discoloration became evident a few days later.

Marchionatto (J. B.). **Las especies de Cyttaria y Cyttariella en la Argentina.** [The species of *Cyttaria* and *Cyttariella* in the Argentine].—*Darwiniana, B. Aires*, iv, 1, pp. 9–32, 7 pl., 3 figs., 1940. [English summary. Received September, 1942.]

This is a critical discussion and revision of the genera *Cyttaria* and *Cyttariella* [*R.A.M.*, xii, p. 116] in the Argentine, where the occurrence of the following species on various species of *Nothofagus* has been established: *Cyttaria darwinii*, *C. harioti*, *C. espinosae*, *C. hookeri*, with three new forms, viz., *typica*, *moroidea*, and *candida*, *C. intermedia*, *Cyttariella deformans*, and *C. skottsbergii*. Three types of tumours are produced by the species of *Cyttaria* under observation, namely, voluminous, tending to encircle the branches and trunk of the host, by *C. harioti*, *C. darwinii*, and *C. espinosae*; small and gregarious, extending along the branches, by *C. hookeri*; and witches' brooms, by *C. darwinii*. The pathological manifestations of *Cyttariella deformans* resemble those of *Cyttaria hookeri*, while *Cyttariella skottsbergii* was found in association with *Cyttaria hookeri* f. *moroidea*.

Spread of White Pine blister rust during 1941.—*Plant Dis. Reptr*, xxvi, 3, pp. 76–80, 1942. [Mimeographed.]

During 1941 *Cronartium ribicola* [*R.A.M.*, xxi, pp. 29, 355] spread in a southerly

direction on *Ribes* spp. from central Virginia and West Virginia into northern Tennessee and North Carolina, while large numbers of cankers were found for the first time on sugar pine (*Pinus lambertiana*) in northern California and southern Oregon in districts where *Ribes* spp. had been found infected in previous years. In the Appalachian region infection spread southwards on wild *Ribes* for about 134 miles. In California the disease spread southwards in the Coast Range for 200 miles and in the Sierra Nevada for 170 miles; tangible evidence was obtained that infection is beginning to establish itself over a wide area in the northern part of the State. The year appeared to have been exceptionally favourable for rust intensification in the western white pine [*P. monticola*] region of north-eastern Washington, northern Idaho, and north-western Montana, owing to exceptionally wet conditions. In the north-central States the disease was recorded on white pine (*P. strobus*) in three more counties in each of Minnesota and Wisconsin, and one more in Michigan.

Pomerleau (R.). **Deux maladies des conifères en pépinière.** [Two diseases of conifers in the nursery.]—*Forêt québéc.*, iii, 9, pp. 13–22, 3 figs., 1941. [Abs. in *Biol. Abstr.*, xvi, 6, p. 1452, 1942.]

From 1931 to 1936 damping-off losses in the forest nursery at Berthierville, Quebec, ranged from 19·5 per cent. for white spruce [*Picea glauca*] in 1932 to 97·5 per cent. for red pine [*Pinus resinosa*] in 1934. The greatest mortality was due to *Fusarium* spp. Other fungi that caused damage were *Rhizoctonia* [*Corticium*] *solani* and *Pythium de Baryanum*. In 1934 the heaviest loss from the last-named occurred soon after the seeds germinated (11th June), while that from *C. solani* occurred a week or two later, and that from *F.* spp. about four weeks after germination (3rd July).

Sowing in soil rich in humus favoured germination in dry weather and damping-off in wet. To sow in soil with little organic matter is the safest procedure. Pine seed should be covered by not more than ¼ in. of soil, and spruce by not more than ⅛ in. The seed should be sown not more than 150 to the running foot in drills, or 500 to the sq. ft. if broadcast. When sowing is done in spring, zinc sulphate, aluminium sulphate, or hydrogen sulphate should be applied to the seed-bed at the rate of ½, ¼, and ⅛ oz. per 1 pt. water per sq. ft., respectively.

The snow fungus (*Phacidium infestans*) [*R.A.M.*, xix, p. 54; xxi, p. 356] also caused much damage, especially to fir and spruce in nurseries and plantations. Control results from the application of sulphur sprays.

Cooke (W. B.). **Resupinate pore fungi.**—*Amer. Midl. Nat.*, xxvii, 3, pp. 677–695, 1942.

This is a critically annotated list of 39 species of *Poria* occurring in Oregon, mostly on logs or rotten wood of conifers and hardwoods, preceded by a history and discussion of the genus and keys to the species enumerated. *P. weirii* is the agent of a severe butt rot of *Thuja plicata* [*R.A.M.*, xx, p. 435; xxi, p. 110].

Birkinshaw (J. H.), Findlay (W. P. K.), & Webb (R. A.). **Biochemistry of the wood-rotting fungi. 3. The production of methyl mercaptan by Schizophyllum commune Fr.**—*Bio-chem. J.*, xxxvi, 5–6, pp. 526–529, 1942.

In the course of cultural tests to determine the most appropriate sources of nitrogen for various wood-rotting fungi, a very disagreeable odour [cf. *R.A.M.*, xix, p. 54 *et passim*], resembling that of decaying cabbage, was exhaled by *Schizophyllum commune*, originally isolated from kiln-dried African mahogany [*Khaya senegalensis*] on a synthetic medium containing ammonium and magnesium sulphates. An analysis of air drawn over the cultures revealed the presence of methyl mercaptan and (probably) traces of hydrogen sulphide.

Brooks (R. L.). **The preservation of timber.**—*J. Instn Petrol. Tech.*, xxviii, 220, pp. 63–81, 1942.

In view of the recent large consumption of indigenous wood (nearly double that of normal years) by the Trinidad petroleum companies, stringent economy to prevent waste is imperative. Hitherto, preventive and remedial measures against the decay and destruction of timber by fungi and insects have been virtually non-existent in the Colony, and recommendations are accordingly made for the prolongation of durability by the use of appropriate kinds of wood and treatment with a reliable preservative. Among the imported and indigenous woods most resistant to fungal depredations are balata [? *Manilkara bidentata*], bois mulâtre [*Pentaclethra macroloba*], guatecare [*Eschweilera subglandulosa*], pitch pine [*Pinus rigida*], Douglas fir [*Pseudotsuga taxifolia*], white fiddlewood [*Citharexylum* spp.], red mangrove [*Rhizophora racemosa*], white olivier, yellow olivier [*Chuncoa obovata*], and sandbox [*Hura crepitans*]. Timbers for industrial concerns to be placed in contact with the ground or exposed to weather or abrasion, e.g., posts, poles, and bridgework, should be treated with a half-and-half mixture of creosote and diesel oil by the pressure or open-tank process, while those intended for dwelling-houses, offices, and the like should be impregnated with a water-soluble salt, such as zinc chloride, which is stated to have proved serviceable in Panama; in this case the preservative treatment should be followed by the application of paint. For interior timbers the dipping, spraying, or brushing methods of treatment may be substituted for the open-tank or pressure processes.

Zycha (H.). **Der Einfluss stickstoffhaltiger Salze auf die Zerstörung von Bauholz durch Pilze.** [The influence of nitrogenous salts on the decay of structural timber by fungi.]—*Angew. Bot.*, xxi, 6, pp. 455–472, 5 figs., 1939. [Received August, 1942.]

Most of the information on the influence of nitrogenous salts on the decay of structural timber by *Coniophora cerebella* [*C. puteana*] and *Paxillus acheruntius* [*P. panuoides*], as determined by laboratory experiments at the Hann.-Münden Institute of Forest Botany, has already been noticed from another source [*R.A.M.*, xix, p. 446]. In a test in which calcium nitrate and magnesium sulphate were added to pure cultures of *P. panuoides* on wooden sticks in dry quartz sand at the rates of 0·3, 0·6, and 1·2, and 0·5, 1·0, and 2·0 gm., respectively, the losses of weight at a moisture content of 54 per cent. after three to four months were 19·3, 18·1, 4·3, 7·1, 7·5, and 3·2 per cent., respectively, the corresponding figures for calcium nitrate (0·3 gm.) and the three magnesium sulphate doses at 47 per cent. humidity being 8·3, 5·2, 5·3, and 2·7 per cent., respectively; the control losses at the lower and higher moisture contents were 4·1 and 7·1 per cent., respectively.

Mention is further briefly made of the attraction of soluble salts for the dry rot fungus, *Merulius lacrymans* [ibid., xv, p. 695], which affords an additional reason for the stringent exclusion of organic matter from the clay used as a filler for ceilings.

Borg (J.). **Ett och annat om kostnader för stängelstolpar samt ev. impregnering av dessa.** [One thing and another concerning the cost of fence posts and their eventual impregnation.]—*Svenska Vall-MosskFören. Kvart.*, iv, 1, pp. 49–63, 1942.

This is a discussion of the cost of fence posts for agricultural concerns in Sweden, and of the economics of impregnation against fungal decay. For the moment the only treatment that can be recommended as practicable is preservation with arsenic salts with a 0·1 per cent. arsenic acid content [*R.A.M.*, xix, pp. 58, 631; xxi, p. 107], carried out either by the open-tank or osmosis process [ibid., xx, p. 505 *et passim*].

Brandenburg (E.). **Über Bormangel an Blumenkohl und Kohlrabi.** [On boron deficiency in Cauliflower and Kohlrabi.]—*Angew. Bot.*, xxiv, 1–2, pp. 99–113, 9 figs., 1942.

Snowball cauliflowers grown in 10 kg. pots containing quartz sand plus 2 per cent. peat and a synthetic solution devoid of boron, as well as in a soil naturally deficient in boron (lime-sandstone) in 1939, developed pronounced pathological symptoms [*R.A.M.*, xx, pp. 518, 554], including malformation of the young leaves, which in some cases were reduced to the midrib and a narrow, irregular lamina, delayed heading, and glassiness of the tissues of the main stem and lateral branches of the head, the top of the latter sometimes assuming a brown discoloration. The application of adequate quantities of boric acid (15, 20, or 30 mg. in the pot tests, 10 mg. being definitely insufficient) corrected all the adverse effect of the shortage and resulted in the production of fine, firm heads. In the natural soil test the heads of plants receiving 30, 15, and 0 mg. boron weighed, respectively, 85, 79·4, and 14·8 gm. In a further test in 1940, using a boron-deficient soil which had supported a beet crop in the previous year, a dose of 60 mg. borax was necessary to produce results comparable to those secured in the first 1939 trials with 30 mg., showing the effect of a withdrawal of the element by the beets [ibid., xviii, p. 428].

Kohlrabi deprived of boron under similar conditions to the foregoing developed a scabby condition of the epidermis and a grey to brown, glassy discoloration of the bulbous roots, resembling that of swedes affected by brown heart [ibid., xvi, p. 430; xxi, p. 426, *et passim*] and imparting an unpalatable softness and insipidity to the flesh. In this case also the undesirable symptoms were corrected by treatment of the soil with 30 mg. boric acid, which increased the leaf and root weights by 65 and 35 per cent., respectively.

Afanasiev (M. M.) & Morris (H. E.). **Control of seedling diseases of Sugar Beets in Montana.**—*Phytopathology*, xxxii, 6, pp. 477–486, 2 graphs, 1942.

Seed treatments with ceresan and new improved ceresan at the rates of 4 and 1 oz., respectively, per 20 lb. lots were found to be of little avail in the control of beet seedling diseases (*Phoma betae*, *Pythium* spp., and *Rhizoctonia* spp. [*R.A.M.*, vi, p. 709], predominantly the first-named) in 1939 and 1940 at the Montana Agricultural Experiment Station, where the best results were secured by the application of complete and balanced soil amendments as follows: nitrogen (250 lb. calcium nitrate per acre, half at planting time, and the remainder as a side-dressing immediately after thinning), treble superphosphate (175 lb.), and manure (14·75 tons in 1939 and 22 tons in 1940), or the same with the addition of lime at 1,000 lb. per acre, the plots in this series showing the minimum of infection (averages of 21 to 27·1 per cent.) and giving the maximum yields of 15·3 to 16·7 tons per acre. In plots receiving nitrogen and phosphorus or manure and phosphorus seedling diseases were prevalent but the yields were fairly satisfactory. A high incidence of disease was registered in the control plots and in those receiving unbalanced fertilizers, especially nitrogen alone. The application of lime alone resulted in a high percentage of seedling disease, and poor stands and yield. It is concluded that seedling diseases of sugar beet in the heavy irrigated lands under observation can be controlled by soil treatments promoting rapid and healthy development of the seedlings.

Tolman (B.) & Murphy (A.). **Sugar-beet culture in the intermountain area with curly top resistant varieties.**—*Fmrs' Bull. U.S. Dep. Agric.* 1903, 52 pp., 28 figs., 1 map, 1942.

Stressing the increased importance of sugar beet production in war time, this popular leaflet gives recommendations for the cultivation, soil management, and control of pests and diseases, of which curly top [*R.A.M.*, xxi, p. 316] is stated to be the most serious danger to beet crops in Utah, Idaho, Oregon, and Washington,

damping-off or black root, and root rots (*Rhizoctonia* spp. including *Corticium solani*) being of minor importance. In Utah and Idaho Russian thistle [*Salsola kali* var. *tenuifolia*], mustards, and filaree [*Erodium* spp.] are the most important weed hosts of the insect vector (*Eutettix tenellus*) and may also serve as the source from which the insects obtain the virus. Over-grazing is the chief factor causing an increase in the weed hosts in the range lands constituting the breeding grounds for the vector, and controlled grazing for even three or four years has been shown to accomplish much in reducing such breeding areas.

McNew (G. L.) & Hofer (A. W.). **Should chemically treated Pea seed be inoculated?** —Reprinted from *Canner*, 2 pp., 1 fig., 1942.

Greenhouse tests with various disinfectants commonly used for the control of [unspecified] soil-inhabiting fungi on peas [cf. *R.A.M.*, xx, p. 241] showed that pea plants inoculated with cultures of nodule bacteria [*Rhizobium leguminosarum*] following treatment with cuprocide (red copper oxide), semesan (hydroxymercurichlorophenol), or 2 per cent. ceresan (ethyl mercury chloride) developed no, or only a few, nodules, and only those grown from inoculated seed treated with spergon (tetrachloroparabenzoquinone), at the rate of 1, 2, or 4 oz. per bush., consistently had nodules comparable in number, size, and location to those on plants grown from untreated seed. It was found that spergon killed about 50 per cent. of the bacteria, while the other disinfectants killed practically all. The growth of the bacteria in pure culture on agar media was inhibited by the addition to the nutrient medium of semesan or 2 per cent. ceresan in doses as small as 1 part in 100,000, while cuprocide and spergon achieved the same only when added at a rate heavier than 1 part in 1,000. When blocks of agar containing 1 per cent. of either spergon, cuprocide, or 2 per cent. ceresan were placed in sterile dishes and covered with melted agar containing millions of nodule bacteria in suspension, it was found that enough ceresan escaped from the block to sterilize the entire plate, cuprocide diffused out and killed the bacteria for some distance, and finally spergon killed only the few bacteria in immediate contact with the agar block. The results of this test are believed to represent roughly the respective effects of the three chemicals on the bacteria on the seed. Results of greenhouse tests, as yet not confirmed by field trials, showed that seed treated with spergon can be successfully inoculated with nodule bacteria provided only strong, viable cultures are used and these are applied immediately before planting to seed treated with not more than 1½ oz. of the disinfectant per bush.

McNew (G. L.). **Lima Beans' response to seed treatment in field tests.**—Reprinted from *Canner*, 3 pp., 2 figs., 1942.

In preliminary experiments in the laboratory and greenhouse spergon [see preceding abstract], new improved semesan jr., and tetramethyl thiuramdisulphide (Dubay 1205–FF) of all the chemicals tested seemed to afford a promising amount of protection against [unspecified] seed-decaying fungi, which are stated to be very destructive to Lima bean [*Phaseolus lunatus*] stands in New York State, particularly in rain-soaked soils. The last-named chemical has not yet been tested in the field and, therefore, cannot be recommended for general use at present. The other two and a mixture similar to spergon, designated No. 528, were subjected to field trials during 1941. It was found that the yields of Henderson's Bush Lima beans were increased by treatment with spergon (2 oz. per bush.) in four different tests by 135, 636, 84, and 721 lb. of beans per acre, respectively, the use of 1 oz. per bush. increasing the yields by 147 and 652 lb. per acre in the first and third tests. The two other materials were less effective than spergon, No. 528 producing an increase in yield of 102 lb. and new improved semesan jr. (1½ oz. per bush.) one of 340 lb. over the untreated controls of the second and fourth tests, respectively. In a test where seed

was planted after the rain, treatment with spergon and new improved semesan jr. improved the emergence, but the yields were increased by only 63 lb. by the former and not at all by the latter dressing. The cost of spergon treatment did not exceed 10 cents an acre. Although results are available for only one season, in which, moreover, the conditions were not favourable for seed decay, enough evidence is stated to exist to warrant recommending spergon for treatment of Lima bean seeds.

HÄHNE (H.). **Beiträge zur Frage der Bekämpfung der durch Pseudomonas medicaginis var. phaseolicola Berk. verursachten Fettfleckenkrankheit der Bohne.** [Contributions to the problem of the control of the Bean grease spot disease caused by *Pseudomonas medicaginis* var. *phaseolicola* Berk.]—*Angew. Bot.*, xxiv, 1–2, pp. 31–61, 1942.

Of recent years the grease spot disease of beans [*Phaseolus vulgaris*] caused by *Pseudomonas medicaginis* var. *phaseolicola* has assumed an alarming extension in Germany, where the affected regions observed by the writer on tours of inspection in 1936 included Bavaria, Württemberg, Baden, Hesse, Rhineland, Oldenburg, Hanover, Schleswig-Holstein, Mecklenburg, Thuringia, and the Saxon Free State, all of which were supplied with seed by firms in the infested zone of the eastern Harz Mountains. The investigations herein reported were concerned with the control of the disease, against which prophylaxis by the exclusive use of sound seed was experimentally shown to be unavailing for the following reasons. Grease spot is so widespread that the number of unaffected fields available as sources of seed is quite inadequate to meet the demand. The mere rejection of seed externally recognizable as infected is useless, since such material is generally non-viable, and therefore of no practical consequence for the perpetuation of the pathogen, and, moreover, apparently healthy seed may be internally diseased. Chemical seed disinfection removes only the bacteria adhering to the outer surface, and the more effective method of immersion in hot water is impracticable on account of the injury inflicted on most varieties by the treatment. Healthy seed cannot be secured by the eradication of all plants with grease-spot symptoms, since the pathogen may be present in a concealed form in those of sound external aspect.

In addition to the cultivation of resistant varieties, a report on which has already appeared [*R.A.M.*, xv, p. 697], quasi-complete commercial freedom from grease spot may be secured, on a financially satisfactory basis, by two or three applications of 0·5 to 1 per cent. Bordeaux mixture, other copper-containing and copper-free preparations being, respectively, less effective and useless. The increases in seed production obtained by spraying were substantial, amounting in the susceptible Wax Olainville variety, for instance, to 65·7 per cent., the corresponding figure for the more resistant Stringless Geneva Market being 17·1 per cent. While this method is quite reliable for all practical purposes, it cannot be guaranteed to produce seed of the absolute purity requisite for the total elimination of the pathogen, which demands the use of carefully selected lines as previously reported.

KREUTZER (W. A.) & GLICK (D. P.). **Control of anthracnose spot of Honey-dew Melons.**—*Fm Bull. Colo. agric. Exp. Sta.*, iv, 1, pp. 9–11, 1942. [Abs. in *Chem. Abstr.*, xxxvi, 13, p. 3898, 1942.]

The agent of melon anthracnose, *Colletotrichum lagenarium*, is spread from diseased to healthy melons by means of the washing water, which should be disinfected by the introduction of chlorine at a minimum concentration of 150 p.p.m., the same treatment being recommended for conveyor belts. All the spores in suspension were killed by contact with commercial hypochlorites in amounts equivalent to chlorine concentrations of 120 to 1,000 p.p.m., even stronger solutions being quite innocuous to ripe melons.